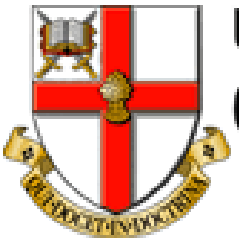

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Physical activity promotion in general practice: Irish GPs' knowledge, attitudes and self-reported practice

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I can confirm that this work has not been submitted for any other degree or examination.

I declare that this is my own original work.

Signed

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List of abbreviations

ACSM - The American College of Sports Medicine

BC - Before Christ

BOS - Bristol Online Surveys

CDC - Centers for Disease Control and Prevention

CHD - Coronary Heart Disease

CI - Confidence Interval

CVD - Cardiovascular Disease

EIM - Exercise is Medicine

EU - European Union

GPs - General Practitioners

HR_{max} - Maximum Heart Rate

HSE - The Health Service Executive

HV - Health Visitors

IBM SPSS - Statistical Package for the Social Sciences

IDF - International Diabetes Federation

IHD - Known ischemic heart disease

NIHSWS - The Northern Ireland Health and Social Wellbeing Survey

OR - Odds Ratio

PA - Physical Activity

PNs - Practice Nurses

SLÁN - The National Survey of Lifestyles Attitudes and Nutrition

WHO - World Health Organisation

Physical activity promotion in general practice: Irish GPs' knowledge, attitudes and self-reported practice

Paper 1: Literature Review

Abstract

Regular PA is one of the most important factors which influences good health and helps control and prevent several chronic diseases. Physical inactivity is a major problem in many countries around the world, including Ireland. Low physical activity levels have led to a very serious overweight and obesity problem for Ireland and with that, a burden of chronic diseases. Previous studies have investigated GPs knowledge, attitudes and practices of PA in the primary care setting in many countries but none have been carried out in Ireland. Promoting PA in primary care through GPs could have a very significant health impact on Irish public.

Word count 5.430 (excluding abstract, titles and headings)

Chapter 1: Introduction

1.1. The relationship between physical activity and health

“Lack of activity destroys the good condition of every human being, while movement and methodical physical exercise save it and preserve it.” (Plato, 427- 347 BC; cited in Ball, Salmon, Giles-Corti, & Crawford, 2006). Awareness of the importance of physical activity (PA) and physical fitness to health and longevity date back to ancient times (Paffenbarger, Blair, & Lee, 2001), where, more than 2000 years ago, Hippocrates (460 - 370 BC; cited in Jones, 1959) recognised the importance of physical exercise and noted that ‘‘eating alone will not keep a man well; he must also take exercise. For food and exercise .... work together to produce health”.

Health is defined as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” (WHO, 1948). While PA and exercise share many common elements, PA is defined as any bodily movement produced by skeletal muscles that results in energy expenditure (US Department of Health and Human Services, 1996), whilst exercise is PA that is planned, structured, repetitive, and done to improve or maintain one or more components of physical fitness (Caspersen, Powell, & Christenson, 1985). Physical fitness is most often defined as a set of attributes that people have or achieve relating to their ability to perform PA (US Department of Health and Human Services, 1996) and includes components such as cardiovascular fitness, musculoskeletal function of the lower trunk, and body composition (Malina, 2001).

Today, the health benefits from PA and exercise are well established. However, it was only in the second half of the 20th century that the first scientific research took place on the relationship between PA and health, when Morris and his colleagues investigated coronary heart disease (CHD) and PA. Morris, Heady, Raffle, Roberts, and Parks' (1953) results showed protection against CHD in active conductors, compared with sedentary drivers of London's double-decker buses and between active postmen compared with sedentary telephonists and government workers.

Since the work of Morris and colleagues in the 1950s (Morris et al., 1953; Morris & Crawford, 1958) there have been numerous studies that have demonstrated the protective effects between PA and risk for several chronic diseases, including CHD (Powell, Thompson, Casperson, & Kendrick, 1987; Sesso, Paffenbarger, & Lee, 2000), obesity (Frank, Andresen, & Schmid, 2004), non-insulin-dependent diabetes mellitus (Helmrich, Ragland, Leung, & Paffenbarger, 1991; Manson et al., 1991), osteoporosis (Cummings, Kelsey, Nevitt, & O'Dowd, 1985; Nguyen, Sambrook, & Eisman, 1998) anxiety and depression (Camacho et al., 1991; Petruzzello, Landers, Hatfield, Kubitz, & Salazar, 1991) as well as some types of cancer (Giovannucci et al., 1995; Thune, Brenn, Lund, & Gaard, 1997).

Many biological pathways responsible for the reduction in the risk of chronic disease and premature death are associated with routine PA (Blair & Connelly, 1996; Warburton, Nicol, & Bredin, 2006). PA provides a number of stimuli which enhance both the metabolic and functional status of the human body (Zoladz & Pilc, 2010).

Although higher amounts of more vigorous activity are associated with greater health benefits, lack of PA is still a very strong predictor of premature mortality (Myers et al., 2004).

PA and health are irreversibly connected. Regular PA is one of the most important factors which influences good health. It can help control weight, strengthen bones and muscles, improve mental health, prevent falls in the elderly and reduce the risk of several chronic diseases including cardiovascular disease (CVD), type 2 diabetes and some cancers (Centers for Disease Control and Prevention, 2015). Despite this knowledge, a large proportion of the world's population still remains physically inactive.

1.2. The Epidemic of physical inactivity

Physical inactivity can be defined as a term used to identify people who do not get the recommended levels of regular PA (Department of Health, 1999). Worldwide, 31.1% of adults are physically inactive (Hallal et al., 2012). Physical inactivity is the fourth leading risk factor for death worldwide accounting for approximately 3.2 million deaths each year (WHO, 2015b)[1]. Smoking and physical inactivity together are considered the two major risk factors for non-communicable diseases globally (Wen & Wu, 2012). Lee et al. (2012) estimate that if physical inactivity were eliminated, there would be an increase in the life expectancy of the world's population by 0.68 (range 0.41 - 0.95) years. With figures such as these, it is no wonder that physical inactivity is considered one of the most important public health problems of the 21st century.

[1] Physical inactivity: A global public health problem

Currently less than half of all American adults are meeting the 2008 PA guidelines (Centers for Disease Control and Prevention, 2014), and in 2013, 32% of Americans did not engage in any leisure time PA of light/moderate or vigorous PA of at least 10 minutes duration per day (Go et al., 2013). Europe is similar as two thirds of the adult population in the European Union (EU) are not reaching the recommended levels of activity and an estimated one million deaths per year are attributed to physical inactivity in the World Health Organisation (WHO) European Region (WHO/Europe, 2014). Compared to America and Europe, Australia is somewhat better as in 2012 adults spent an average of just over 30 minutes per day doing PA, however, only 43% of adults actually met the National Physical Activity Guidelines to do at least 30 minutes of moderate intensity PA on most days (Australian Bureau of Statistics, 2013). Asia too is experiencing a major problem with physical inactivity (Muntner et al., 2005; Park et al., 2014). A systematic review of physical activity patterns among South Asian adults revealed that India, one of the most populated countries in the world, had a prevalence of inactivity that varied widely from 18.5% - 88.4%, with Pakistan at 60.1% and Sri Lanka varying from 11.0% - 31.8% (Ranasinghe, Ranasinghe, Jayawardena, & Misra, 2013).

The WHO defines overweight and obesity as abnormal or excessive fat accumulation that may impair health. Childhood obesity is well established as a global epidemic (Deckelbaum & Williams, 2001; Ebbeling, Pawlak, & Ludwig, 2002; O'Dea, 2005; WHO/ECHO, 2015). The worldwide prevalence of overweight and obese children increased from 4.2% (95% confidence interval (CI): 3.2%, 5.2%) in
1990 to 6.7% (95% CI: 5.6%, 7.7%) in 2010 (de Onis, Blössner, & Borghi, 2010).

In 2013, 42 million infants and young children under the age of 5 were overweight or obese and if current trends continue an expected 70 million young children will be overweight or obese by 2025 (WHO/ECHO, 2015). Although the increase in obesity is multifactorial (Rennie, Johnson, & Jebb, 2005), studies (Goran, 1997; Trost, Kerr, Ward, & Pate, 2001; Weinsier et al., 1998) have shown that physical inactivity is a major contributing factor in the development and maintenance of childhood obesity.

The decrease in physical activity in recent times is deeply concerning. Lob-Corzilius (2007, p587) states:

> The ubiquity of modern technology in many households and the motorisation in various areas of life has greatly contributed to a decrease in physical activity and significantly reduced energy expenditure. This process is further intensified with the presence of various electronic devices, such as TV, PC, notebook, etc. in the bedrooms of children and adolescents, whose pastime activities have become increasingly more ‘‘passive’’ and physically undemanding.

Many studies (Arluk, Branch, Swain, & Dowling, 2003; Epstein et al., 1995; Hu, Colditz, Willett, & Manson, 2003; Tremblay & Willms, 2003) have demonstrated that sedentary behaviours such as television viewing and playing video games are linked with child and adult obesity. On a positive note, it has been shown that by just decreasing sedentary time, obesity can be treated (DeMattia, Lemont, & Meurer, 2007; Epstein, Paluch, Gordy, & Dorn, 2000). This very much emphasizes the significance of PA.

The health consequences of child obesity are very significant. Short term consequences can include orthopaedic, neurological, cardiovascular, psychological and social difficulties (Must & Strauss, 1999; Reilly et al., 2003). Strong evidence (Clarke & Lauer, 1993; Freedman et al., 2005; Singh, Mulder, Twisk, Van Mechelen, & Chinapaw, 2008) suggests being overweight or obese as a child is likely to continue into adulthood and so long term consequences include premature mortality (Reilly & Kelly, 2010) and non-communicable diseases in later life such as CVD, diabetes and some forms of cancer.

As it is difficult to reduce excessive weight once it has become established, prevention should be considered the key strategy for controlling the current epidemic of obesity and therefore children should be the priority. Parents need to be equally involved as they have a very significant influence on their child's behaviour and lifestyle. Moreover, studies have shown that parents' own PA levels affect their children's PA (Moore et al., 1991; Trost et al., 2001) and those who are obese can cause a major risk factor for their children's weight (Maffeis, Talamini, & Tato, 1998; Strauss & Knight, 1999). Evidence (Watson et al., 2011) suggests that targeting families as a whole can be an effective way of making behavioural changes in promoting active lifestyles and helping in weight management.

Chapter 2: Background

2.1. Physical activity levels, obesity, and chronic diseases in Ireland

In 2007, The National Survey of Lifestyles Attitudes and Nutrition (SLÁN) (Morgan et al., 2008) found that only 41% of Irish adults took part in moderate or vigorous PA lasting at least 20 minutes three or more times a week. Furthermore, 1 in 5 adults were found to be inactive. Morgan, O'Farrell, Doyle, and McGee (2011) compared and combined the Northern Ireland Health and Social Wellbeing Survey (NIHSWS) 2005-2006 to the SLÁN survey (Morgan et al., 2008) and found that overall, 45% of participants reported being moderately physically active and 36.6% reported low levels of PA, as shown in Figure 1 below.

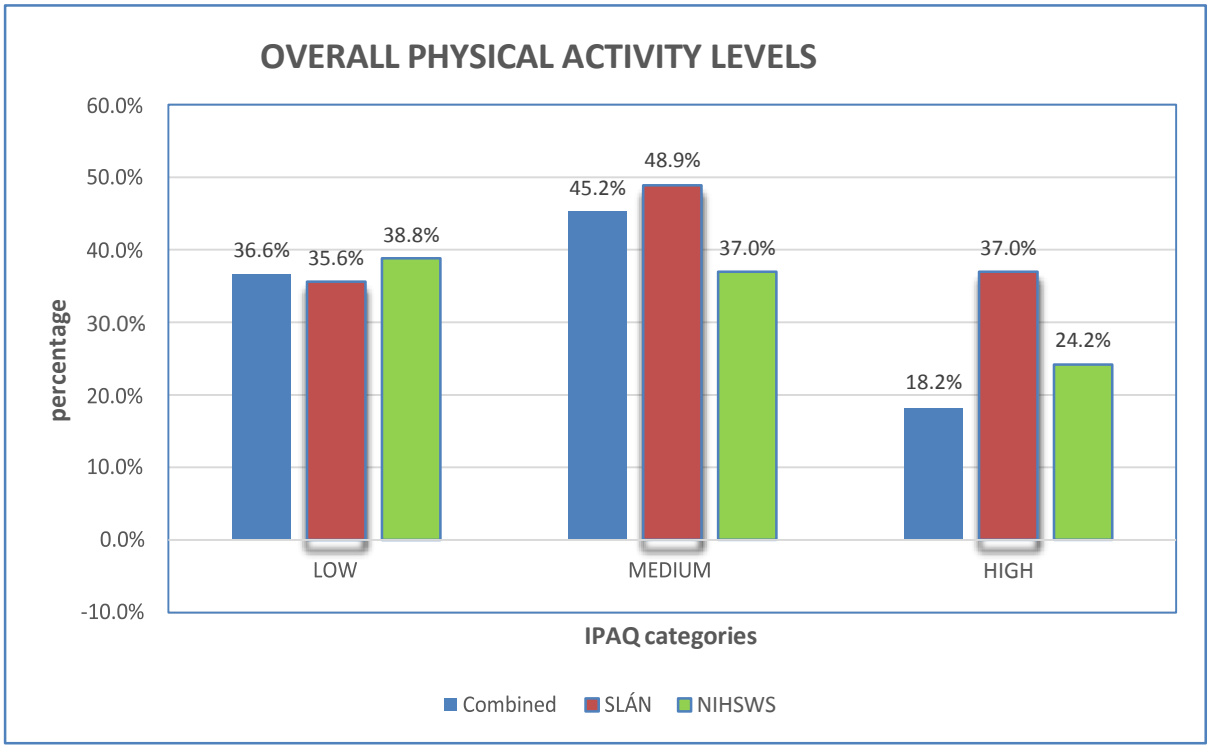

Figure 1: *Physical activity levels for SLÁN 2007, NIHSWS 2005-2006 and the total sample*.

Source: Morgan, O'Farrell, Doyle, & McGee (2011).

The level of PA among older adults is also worrying. Murtagh, Murphy, Murphy, Woods, and Lane (2014) have shown that PA declines with age and adults aged 75 and over, are on average 2.5 times more likely than 60-64 year olds to be insufficiently active.

What is more disturbing, are the levels of PA among Irish children. Ireland's "report card" on PA in children and youth (Harrington, 2014) was disappointing. One of the major studies included in this report was 'Growing Up in Ireland' by Williams et al. (2011). This was one of Ireland's largest and most complex studies on children consisting of 8,750 nine year old children. It was found that only one in four met the recommended 60 minutes of PA per day and boys were more likely than girls to meet the recommendation, 29% compared with 21%.

Over one third of the Irish adult population reported that they had a chronic illness in 2008 (Balanda, Barron, & Fahy, 2010; Health Services Executive, 2008). Nearly all deaths from chronic disease occur before the age of 70 (WHO, 2015a)[2], and this includes young and middle aged people (WHO, 2005). Heart disease has been the principal cause of death in Irish people. According to the Irish Heart Foundation (n.d.), approximately 10,000 people die each year from CVD, including CHD, stroke and other circulatory diseases. Deaths from cancer averaged about 8,800 deaths per year during 2010-2012 (National Cancer Registry, 2014). Figure 2 illustrates that mental health conditions is the leading cause of morbidity in Ireland (Department of Health and Children, 2014).

[2] Noncommunicable diseases

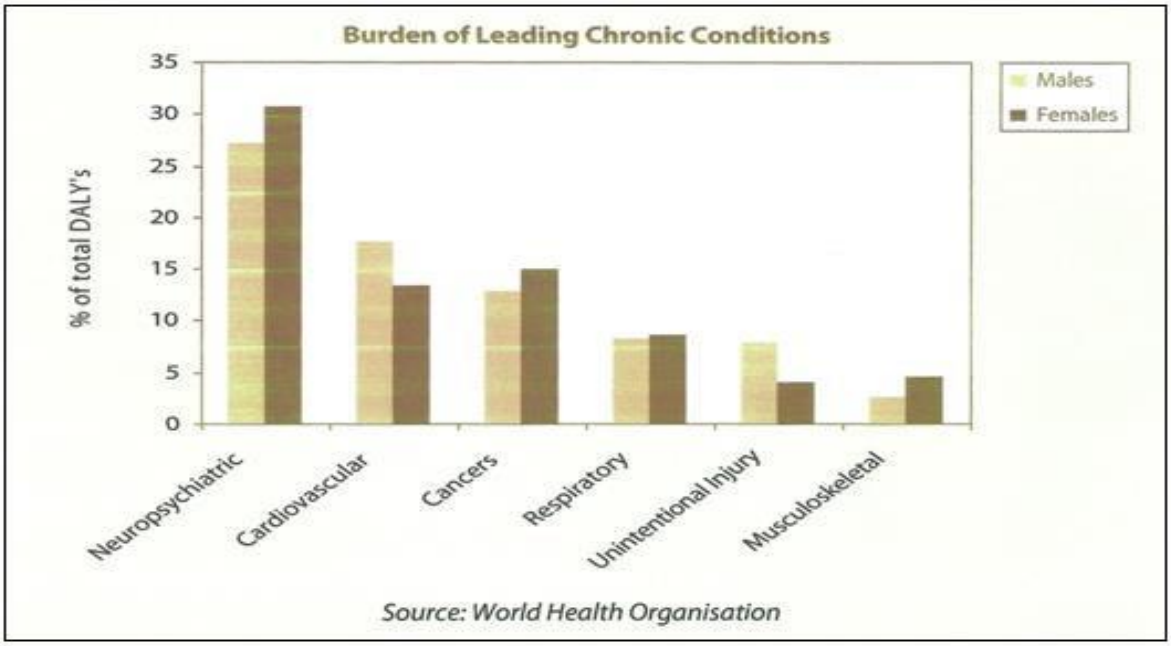

Figure 2: *Burden of leading chronic diseases in Ireland*

Source: *Department of Health and Children*

Aware (2015), a voluntary organisation which supports people with depression, predicts that there are more than 450,000 people in Ireland who suffer from depression and an estimated 500 people die each year from suicide (Health Services Executive, 2007). Irish studies (Morgan et al., 2011; Harrington et al., 2009) have shown that protective lifestyle factors such as PA are associated with better mental health and overall wellbeing. Concerning diabetes, the International Diabetes Federation (IDF) (2013) estimates that there are 207,490 people with diabetes in Ireland in the 20-79 age group. The prevalence of diabetes is mainly because of an increase in the incidence of Type II diabetes due in part to the increases in childhood and adolescent obesity (Health Services Executive, 2008). Moreover, the previously mentioned diseases are and can be, a direct result of being overweight or obese (Bray, 2004).

According to the SLÁN report (Morgan et al., 2008), the levels of overweight and obesity in Ireland have increased considerably since 1998. The cost of overweight and obesity to Ireland was estimated to be €1.13 billion in 2009 (Safefood, 2012). In 2011, the National Longitudinal study of Children (Layte & McCrory, 2011) showed that 19% of 9 year olds were overweight and a further 7% were obese. In the same year the National Adult Nutrition Survey (2011) found that a total of 24% of 18-64 years olds were obese (men 26%, women 21%) and 37% were overweight (men 44%, women 31%). Currently, one in four children is overweight or obese in Ireland (Safefood, 2013). Concerning older adults, the Irish Longitudinal Study on Ageing (Leahy, Nolan, O' Connell, & Kenny, 2014) recently found that 36% of over 50s are obese and a further 43% are overweight. Considering the population projections which predict almost a doubling of the elderly population over the next 30 years (Central Statistics Office, 2013), together with the current lifestyle patterns in adults and children, a significant increase in chronic diseases is set to occur. By 2020, the number of adults with chronic conditions is said to increase by around 40% (Balanda et al., 2010).

2.2. The national guidelines on physical activity for Ireland.

The national guidelines on PA for Ireland are summarised in Table 1.

Table 1: *The national guidelines on PA for Ireland.*

Who?	How much?	How often?	What counts?
Children and young people	At least 60 minutes moderate intensity activity	Every day of the week	All activity no matter how short counts
Children and young people with disabilities	At least 60 minutes moderate intensity activity or as much as ability allows	Every day of the week	All activity no matter how short counts
Adults	At least 30 minutes moderate intensity activity	5 days of the week	Short bouts of at least 10 minutes can be accumulated
People with disabilities	At least 30 minutes moderate intensity activity, or as much as ability allows	5 days of the week	Short bouts of at least 10 minutes can be accumulated
Older people	At least 30 minutes moderate intensity activity, or as much as ability allows	5 days of the week	Short bouts of at least 10 minutes can be accumulated

Source: *Get Ireland Active*.

The Health Service Executive (HSE) and the Department of Health and children recommend that children and young people (aged 2-18) should be active for at least 60 minutes every day at a moderate to vigorous level (Get Ireland Active, 2007). Muscle strengthening, flexibility and bone strengthening exercises are advised three times a week. Adults and older adults should do at least 30 minutes of moderate activity on 5 days a week or 150 minutes a week. The guidelines encourage the idea that they can be achieved in various ways e.g. in bouts of 10 minutes and 75 minutes of vigorous activity a week instead of 150 minutes of moderate activity.

For adults, muscular strength and endurance activities are advised two to three days per week while older adults should focus on aerobic activity, muscle strengthening and balance.

While the guidelines are the same for other countries in their recommendations, a major failure in the Irish guidelines is in not recognising the significance of physical inactivity. For example, America (US Department of Health and Human Services, 2008) state before any PA recommendation, that all adults should avoid inactivity and England (Department of Health, 2011) gives examples on how to minimise sedentary behaviour. Moreover, England is more specific in its guidelines as they provide two recommendations for under 5s, those who are capable of walking and those who are not, while Ireland does not provide any recommendations for those under the age of two. PA should be recognised and established as early as possible in the early years of life and continue right through into old age.

2.3. Primary health care in Ireland

Health care in Ireland is both public and private. The health care system is managed by the HSE which provides a range of primary care and community services throughout the country (Health Service Executive, 2013). Primary healthcare in Ireland is mainly operated by GPs who lie at the heart of the system and work privately with other GPs and nurses. It has been estimated there are approximately 14 million visits to GPs annually, compared to 6.3 million hospital visits (Teljeur, Tyrell, Kelly, O' Dowd, & Thomas, 2014).

In 2010, a national survey of chronic disease management in Irish general practice was conducted and it was found that 63% of GPs (380 completed questionnaires; 72% response rate) believed that there were some good aspects in the Irish health service but significant changes were needed to facilitate the management of chronic care (O'Dowd et al., 2011). The main barriers to delivering chronic care were an increased workload and a lack of appropriate funding for chronic disease management. The Health Service Executive (2014) has listed several service priorities for 2015, including those in primary care. One priority is to "implement models of care for chronic illness management". One of the key objectives in 2015 will be to target and change behaviours which will decrease the burden of chronic disease.

Chapter 3: Research

3.1. Previous studies of GPs' knowledge, attitudes and practices of physical activity

Several studies (Lawlor, Keen, & Neal, 1999; Al Shehabi, Ali, Al-Khalif, & Radwan, 2006; Douglas, Torrance, van Teijlingen, Meloni, & Kerr, 2006; van der Ploeg et al., 2007; Shirley, van der Ploeg, & Bauman, 2010; Calleja, 2011; Watson, Khan, & Crear, 2013) have investigated general practitioners' (GPs) knowledge, attitudes and practices of PA in the primary care setting. In the mid 1990s, when the significance of regular PA was becoming more established (Pate et al., 1995), studies such as Gould, Thorogood, Iliffe, and Morris (1995), and Bull, Schipper, Jamrozik, and Blanksby (1997) began investigating PA promotion and knowledge of PA by GPs.

Studies have become increasingly common in recent years in various countries

around the world as the epidemic of physical inactivity and the burden of chronic disease continues to persist and worsen. Ireland on the other hand, has had no specific study which has investigated GPs' knowledge, attitudes and practices of PA. There have been studies (Brotons et al., 2005; Lambe & Collins, 2009; Collins, Vahey, & Sheehan, 2010) though which have focused on lifestyle counselling and health promotion, including PA.

A qualitative study by Lambe and Collins (2010) investigated lifestyle counselling by GPs in Ireland and the main finding was that GPs do regularly conduct lifestyle counselling despite several barriers including insufficient time, patient resistance, lack of funding for prevention and lack of training. A limitation to this study however, was that the purposive sampling method could have led to enthusiasts of lifestyle counselling attending the focus groups and in addition there were a low number of GPs (n = 56) who participated. Brotons et al. (2005) investigated the views and opinions of GPs regarding prevention and health promotion in clinical practice in eleven European countries, including Ireland. Over half (60.75%) of the GPs surveyed from Ireland felt that carrying out prevention and health promotion activities was difficult. Furthermore, just under half (48.14%) felt minimally effective or ineffective in helping patients practice regular physical exercise.

3.1.1. Level of physical activity promotion

Overall, the level of PA promotion is mixed. Reasons for this variation depend on the country and other factors, as shown in Table 2.

Table 2: *Summary of selected studies of GPs' reported level of PA promotion*

Reference	*N*	Response rate	Country	Level of PA promotion
Walsh et al. (1999)	175	54%	USA	43% of physicians counsel >50% of patients about exercise. 14% prescribed exercise to >50% of patients.
Kennedy and Meeuwisse (2003)	330	61.6%	Canada	67% counsel <50% of patients about PA. 12% counsel ≥ 76% of patients about PA.
Ribera et al. (2005)	145	59%	Catalonia	84% promote PA to their patients.
Douglas et al. (2006)	376	47%	UK	62% likely/very likely to recommend PA to all healthy adult patients.
Buffart et al. (2009)	511 747 646	40% 53% 64%	Australia	1997: 43% discuss PA with ≥10 patients/wk. 2000: 44% discuss PA with ≥10 patients/wk. 2007: 53% discuss PA with ≥10 patients/wk.
Calleja (2011)	156	53%	Malta	44% encouraged ≥30 patients about PA in the previous month.
Bock et al. (2012)	260	13.3%	Germany	55% of physicians advised patients about PA.
Jørgensen et al. (2012)	223	56.3%	Denmark	95% give PA advise weekly.
Watson et al. (2013)	255	"Low"	South Africa	84% promote PA to their patients.

Countries, where less than half of GPs were found promoting PA, include Australia, Canada, and the USA. Bock, Diehm, and Schneider (2012) found that, compared to their counterparts, GPs in large cities (odds ratio (OR) = 3.93; (95% CI: 1.55 - 9.99), and those cooperating with sports clubs (OR = 1.75; 95% CI: 1.03 - 2.96) were more likely to provide PA promotion. More positive results have been found in South Africa, Catalonia, and Denmark. The main reason for the high percentage in Denmark (95%) lies in the fact that PA counselling is systematically implemented in some parts of the country (National Board of Health, 2004).

3.1.2. Conditions for which GPs provide PA advice to their patients

GPs most frequently give PA advice to patients who are overweight or obese. Lawlor et al. (1999) found that 77% (n = 134) of GPs indicated they would always give advice to patients who were overweight. Moreover, Watson et al. (2013) found that 91% (n = 230) would always give advice to patients who were obese or overweight. It is likely though that this higher percentage was due to the question item including both overweight and obesity, whereas Lawlor et al. (1999) only included overweight. Other common conditions which GPs frequently give PA advice to their patients, include, diabetes, known ischaemic heart disease (IHD) and hypertension (Lawlor et al., 1999; Douglas et al., 2006; Watson et al., 2013). Douglas et al. (2006) found that most primary care staff routinely discussed and advised patients about PA, regardless of the condition (primary prevention). Calleja (2011) on the other hand found that most Maltese GPs only discussed PA with patients who had a presenting condition (secondary prevention). The percentage of GPs who provided advice to sedentary but otherwise healthy patients often or very often was much lower (70%; median ‘often’)

than all the other conditions, apart from depression (67%; median 'often').

Worse still, Lawlor et al. (1999) found that just 8% (n = 14) of GPs would give advice to all patients.

3.1.3. Barriers to physical activity promotion

The majority of GPs agree they have a role in promoting PA to their patients (Please refer to 3.1.8), however despite this, many barriers affect the likelihood of this occurring. The most frequently cited barrier by GPs is lack of time. Brotons et al. (2005) found that 84.72% of GPs surveyed in Ireland cited a heavy work load and lack of time as the main barrier, while the second most common barrier was no reimbursement (55.56%). Other countries included in this study also share this finding. Although there was a large number of GPs who participated (n = 2082), the response rate was somewhat low (54%). McKenna, Naylor, and McDowell (1998) gained a response rate of 73% GPs (n = 419) and found the most common barriers included lack of time, lack of resources, and lack of success, although this included practice nurses (PNs) in addition to GPs. Nevertheless, an important finding from this study was that GPs were less likely to regularly promote PA with their patients if they indicated lack of time as a barrier (OR = 0.73, 95% CI: 0.58 - 0.93) or lack of incentives (OR = 0.74, 95% CI: 0.59 - 0.94), and more likely to promote exercise if they themselves exercised regularly (OR = 3.19, 95% CI: 1.96 - 5.18).

3.1.4. GPs' physical activity levels

GPs that exercise regularly are more likely to counsel and promote PA to their patients than those who don't. For example, McKenna et al. (1998) found that GPs were more likely to promote exercise if they themselves exercised regularly (OR = 3.19, 95% CI: 1.96 - 5.18). Likewise, Brotons et al. (2005) results showed that sedentary GPs advised sedentary patients to perform regular physical exercise less often than GPs who exercised regularly, both in the first clinical scenario (54.64 vs. 59.82, p = .045), as well as the second clinical scenario (53.61 vs. 56.00, p = .034). Out of the eleven countries which took part in this study, Ireland had the highest score of GPs who exercised regularly (62.21%), that is, daily or two to three times a week. Compared to Ireland, Greece had the lowest (23.33%), however, this can be linked to Greece having the lowest number of participants (n = 32). Further still, the numbers of participants varied in all countries and the authors did not include the response rates for each country, so therefore it is impossible to consider Ireland as having the most active GPs.

Several review papers (Lobelo, Duperly, & Frank, 2009; Fie, Norman, & While, 2012; Hébert, Caughy, & Shuval, 2012; Vuori, Lavie, & Blair, 2013) agree on the research that GPs who exercise regularly are more likely to counsel and promote PA to their patients and provide better counselling and motivation to their patients.

3.1.5. GPs' confidence in promoting physical activity

Several studies (Bull et al., 1997; Lawlor et al., 1999; Douglas et al., 2006; van der Ploeg et al., 2007; Buffart, van der Ploeg, Smith, Kurko, King, & Bauman, 2009) have found that GPs' confidence in promoting PA is high, however, this differs greatly

between general and specific advice. For example, Bull et al. (1997) found that 91.3% (71% response rate) of GPs agreed or strongly agreed that they felt confident in providing general advice to patients on PA. In spite of this, only 45.5% felt the same about giving specific advice on PA. Van der Ploeg et al. (2007) found that 83% and 92% of GPs felt confident in providing general advice to patients on PA in 1997 and 2000, respectively. However, in relation to providing specific PA programmes for patients, a lower percentage of GPs felt confident doing this, 63% in 1997 and 71% in 2000. Similar results were observed in 2007 (General advice, 92%; Specific advice, 69%) (Buffart et al., 2009).

3.1.6. GPs' knowledge of the physical activity recommendations

Most studies have found that GPs knowledge of PA recommendations is very low. In Malta, only 19% of GPs knew either the Maltese or the United Kingdom's PA recommendations, leaving 81% of GPs knowing neither (Calleja, 2011). In Scotland, just 13% of GPs correctly described the current recommendations (Douglas et al., 2006). Walsh, Swangard, Davis, & McPhee (1999) found a similar result as only 12% of physicians were familiar with the new American College of Sports Medicine (ACSM) recommendations. For the physicians who did know the ACSM recommendations, they were somewhat more likely to engage in regular exercise counselling (62% vs. 40%, $p = .06$). Calleja (2011) on the other hand, found no significant difference ($p = .082$, Cramer's $V = 0.140$) in the relationship between knowledge of the PA recommendations and frequency of promoting PA.

3.1.7. GPs' knowledge of physical activity required for health benefits

Lawlor et al. (1999) found that, in general, GPs' knowledge of PA required for health benefits was good. According to their findings nearly three-quarters of responders believed that any level of activity was beneficial to health and less than 10% stated that strenuous or vigorous activity was necessary. While the response rate was relatively good (74%, n = 174 GPs), responders were different from non-responders as they were more likely to be in partnerships than in single-handed practice (8% of responders worked single-handed compared with 23% of non-responders, $p < .01$), be members or fellows of the Royal College of General Practitioners (50 versus 31%, $p < .05$), and more likely to have 10 or fewer years of experience as a GP (45 versus 16%, $p < .001$). Therefore the non-responders had a direct influence on the findings and the results should not be generalised. Furthermore, a major concern with this study was that the data analysis was inadequately described and the statistical significance was not assessed.

Buffart et al. (2009) performed a repeated cross-sectional survey which looked at GPs' perceptions and practices of PA counselling over a 10 year period. 646 (40%), 747 (53%) and 511 (64%) GPs participated in 2007, 2000 and 1997, respectively. In 2007, 335 GPs (52%) agreed that taking the stairs at work and generally being more active each day was enough physical activity to improve health. This was an improvement to 1997 where only 150 GPs (30%; $p < .001$) agreed. Moreover, there were more GPs (n = 326, 51%) in 2007 who believed that vigorous activity was necessary to acquire health benefits, compared to 2000 (OR for 2000, 0.54; 95% CI: 0.43 - 0.68). Similarly, Watson et al. (2013) found that over half (55%) of GPs believed that exercise at 70 - 80% of the maximum heart rate (HR_{max}) was necessary. It must

be noted though that there was a declining response rate in 2007 which could explain these outcomes and result in a selection bias with GPs.

3.1.8. GPs' role perception regarding physical activity promotion

The majority of GPs agree that they have a role in promoting PA to their patients. However, this is despite levels of PA promotion remaining mixed (Please refer to 3.1.1). Watson et al. (2013) found that 75% (*n* = 190) of GPs believed strongly that promoting PA is an important part of primary healthcare. Unlike other studies (Bull et al., 1997; Buffart et al., 2009) where levels of PA promotion can be low, 84% (*n* = 213) of GPs said they promoted PA to their patients. This is a strong point of this study as the role perception and level of PA promotion correspond. However, it must be noted that there was a low response rate in this study as mentioned by the authors. The fact that they do not state this or include the total number of questionnaires distributed suggests it was poor and selection bias may have occurred. Therefore, this study may not reflect South African GPs as a whole.

Other studies (Bull et al., 1997; van der Ploeg et al., 2007; Buffart et al., 2009) also found role perception to be high. There have been mixed findings with regard to role perception nonetheless. Graham, Dugdill, and Cable (2005) used a multi-method approach, combining quantitative (postal survey) and qualitative (semi-structured interviews) data collection techniques. Mixed views were obtained from the semi-structured interviews. Although the majority of interviewees felt that their role was important with regard to PA promotion, some GPs felt this role was not particularly important with one GP stating, "I don't think it is entirely significant, I really don't".

A limitation of this study was that GPs volunteered for the interview in response to the postal questionnaire using a tick box which could cause selection bias. Even though a large majority of GPs agree they have a role in promoting PA amongst their patients, many factors exist which affect the likelihood of GPs carrying out this role.

3.1.9. Strategies for implementation of physical activity promotion in general practice

Unfortunately for many countries, PA prescription is not yet a standard practice in primary care. For that reason, strategies are necessary and are required for implementing PA promotion in general practice. In Canada, 69.8% of GPs reported using verbal counselling to promote PA while only 15.8% reported using written prescriptions (Petrella, Lattanzio, & Overend, 2007). Similarly, Watson et al. (2013) found that just 21% of GPs reported using written material.

Exercise is Medicine (EIM) (ACSM, 2015) is currently one of the leading strategies for implementing PA promotion in general practice for many countries around the world. EIM is a global health initiative managed by the ACSM which focuses on encouraging primary care physicians to include PA when designing treatment plans for patients (ACSM, 2015). As it stands Ireland is yet to join.

Chapter 4: Rationale for the promotion of physical activity by GPs

The European definition of general practice/family medicine (WONCA, 2002, p6) states that “General Practitioners/family physicians exercise their professional role by promoting health, preventing disease and providing cure, care, or palliation”. Health promotion and disease prevention are important areas of primary health care and in the role of GPs. GPs are required to manage both acute and chronic health problems of individual patients, manage illnesses in the early stages of their development and promote health and well-being (WONCA, 2002).

GPs are ideally positioned to offer health promotion advice on PA to patients because they have access to a large percentage of the population (Statista, 2015). In 2011, patients in Great Britain visited their GP on average five times per year, while in the United States patients visited their GP 4.1 times (Statista, 2015). It is estimated that there are almost nine times as many general practice encounters than hospital encounters each year in Ireland (Collins & Janssens, 2012). GPs are seen by the public as credible sources of information and they are widely trusted. A recent study by Kennedy, Vahey, and Collins (2014) found that Irish patients had very high levels of trust in their GP. Furthermore, GPs were rated higher than any other profession in terms of general public trust in the United Kingdom (Ipos MORI, 2011).

While the review papers of Eaton and Menard (1998) and Eden, Orleans, Mulrow, Pender, and Teutsch (2002) were inconclusive, other review papers (Simons-Morton, Calfas, Oldenburg, & Burton, 1998; Eakin, Glasgow, & Riley, 2000; Orrow, Kinmonth, Sanderson, & Sutton, 2012) have been more positive in their findings. Simons-Morton et al. (1998) concluded that interventions in health care settings can increase PA for both primary and secondary prevention. Furthermore, results from Orrow et al. (2012) showed that from 15 trials (*n* = 8745), 13 trials presented small to medium positive intervention effects at 12 months (OR = 1.42, 95% CI: 1.17 - 1.73; standardised mean difference 0.25, 0.11 - 0.38). This was a similar finding to Elley, Kerse, Arroll, and Robinson (2003).

Chapter 5: Conclusion

It is expected that this study will give a general picture of Irish GPs' knowledge of, attitudes to and self-reported practices of PA promotion in Ireland. It is hoped that this study will increase GPs' awareness about the significance of regular PA for all of their patients. With the current state of Irish health and the prediction that Ireland is heading for a serious overweight and obesity problem in the next 15 years (Breda, Jewell, Webber, & Galea, 2015), it is vital that attempts are made to tackle the burden of chronic disease and physical inactivity in the country. Promoting PA in primary care through GPs could have a very significant health impact on the Irish public.

The primary research questions to be addressed are:

i. How often do Irish GPs encourage their patients to have a more physically active lifestyle?

ii. Are GPs more likely to promote PA if they perceive it as relevant to the patient's condition (secondary prevention), rather than routinely with all patients (primary prevention)?

iii. How well do Irish GPs know the national PA recommendations for Irish adults

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Physical activity promotion in general practice: Irish GPs' knowledge, attitudes and self-reported practice

Paper 2: Research Project

Proposed Journal for publication: *Family Practice*. Published by Oxford University Press, Oxford.

Rationale

It is intended to publish this paper in the journal of *Family Practice*. The reason for choosing this journal is because it is aimed at researchers in the fields of primary care and general practice. Furthermore, this journal deals with areas such as the practice of primary care, health promotion and disease prevention, which are core aspects of this research article. As *Family Practice* is a well renowned and respected journal, one can expect that this would reach a wide and varied audience.

Key Words: ***Health, Primary care, Chronic diseases, Prevention.***

Word count 4.328 (excluding abstract, titles and headings)

Abstract

Background and aims: *Regular PA is one of the most important factors which influences good health and helps control and prevent several chronic diseases. Promoting PA in primary care through GPs could have a very significant health impact on the Irish public. The aim of this research project was to investigate and analyse Irish GPs' knowledge, attitudes, and self-reported practice of promoting and recommending PA in Ireland.*

Methods: *An electronic survey was used and sent to 711 GPs from 381 practices across Ireland in April 2015. A total of 80 GPs responded, giving a response rate of 11%.*

Results: *The level of PA promotion claimed by Irish GPs was somewhat high (67% promoted PA often (31-50% of patients) or more often (>70% of patients)), however, only 30% (n = 24) of GPs knew the national PA recommendation for Irish adults. Irish GPs are more likely to promote PA if they perceive it as relevant to the patient's condition (secondary prevention), rather than routinely with all patients (primary prevention).*

Conclusion: *This study raises doubt as to the true level of PA promotion by Irish GPs, and highlights that many Irish GPs do not know and/or are unaware of the national PA recommendations. If no action is taken, there could be very serious implications for the future health of the nation.*

Chapter 1: Introduction

The health benefits from regular physical activity (PA) are well established. Regular PA is one of the most important factors which influences good health and helps control and prevent several chronic diseases including cardiovascular disease (CVD), obesity, type 2 diabetes and some cancers (Centers for Disease Control and Prevention, 2014). However, despite this knowledge, a large proportion of the world's population still remains physically inactive.

PA levels amongst the Irish population have been shown to be poor (Morgan et al., 2008) and chronic diseases such as CVD, depression and cancer are the leading causes of death and disability in Ireland. With the current state of health and the prediction that Ireland is heading for a serious overweight and obesity problem in the next fifteen years (Breda, Jewell, Webber, & Galea, 2015), it is vital that attempts are made to tackle the burden of chronic disease and physical inactivity in the country.

Health promotion and disease prevention are important areas of primary health care and part of the role of general practitioners (GPs). GPs are ideally positioned to offer health promotion advice on PA to patients because they have access to a large percentage of the population (Statista, 2015). They are seen by the public as credible sources of information and are widely trusted (Ipos MORI, 2011; Kennedy, Vahey, & Collins, 2014). Several studies (Lawlor, Keen, & Neal, 1999; Buffart, van der Ploeg, Smith, Kurko, King, & Bauman, 2009; Calleja, 2011; Watson, Khan, & Crear, 2013) have investigated GPs' knowledge, attitudes and practices of PA in the primary care setting in various countries; however, Ireland has had no specific study which has

investigated GPs' knowledge, attitudes and practices of PA. It is crucial to obtain a general picture of Irish GPs' knowledge, attitudes, and self-reported practices of PA promotion, to allow for improvements to be made in this area. Promoting PA in primary care through GPs could have a very significant health impact on the Irish public. The aim of this research project was to investigate and analyse Irish GPs' knowledge, attitudes, and self-reported practices of promoting and recommending PA in Ireland.

Chapter 2: Method

2.1. Study design

An electronic survey was used to investigate and analyse Irish GPs' knowledge, attitudes, and self-reported practices of promoting and recommending PA in Ireland. The Bristol Online Surveys (BOS) tool was used as this was a simple and convenient method for GPs to complete the survey. The data was collected using a slightly adapted version of a questionnaire by Calleja (2011). The original questionnaire by van der Ploeg et al. (2007) was designed for studies involving PA promotion in general practice. The questionnaire was pilot tested and shown to take 5 minutes to complete and has been used by other studies in the past (Buffart et al., 2009; Shirley, van der Ploeg, & Bauman, 2010).

The questionnaire (Refer to Appendix 2) covered the following topics: GPs' knowledge of the amount of PA required for health benefits in adults (four items), GPs' perceived role in PA promotion (three items), GPs' confidence in promoting PA (two items), frequency of GPs providing PA advice to patients with various conditions (seven items), barriers to PA promotion (seven items), and feasibility of different PA promotion

strategies (five items). All items were scored on a 5-point Likert scale ('Strongly Agree' to 'Strongly Disagree', or 'Never' to 'Very Often' or 'Highly Feasible' to 'Totally Unfeasible'). Prior to these topics, GPs were asked about the percentage of patients they encouraged to lead a more physically active lifestyle in the previous month. General demographic data was recorded, and GPs were asked if they knew the national PA recommendation for Irish adults. If GPs answered 'Yes', they were then asked to describe the recommendations. Finally, GPs were asked about their own PA levels compared to other Irish people of the same sex and age on a 5-point scale (ranging from 'Much more active' to 'Much less active') and for approximately how long they are physically active each week.

2.2. Setting and participants

GPs were invited to participate if they were currently practising in Ireland. They were contacted by email and were provided with a recruitment letter, together with a participant information sheet and questionnaire (Refer to Appendices 2 - 4). GPs' email addresses were obtained from the Irish College of General Practitioners website (http://www.icgp.ie/go/find_a_gp) and the National Cervical Screening Programme website (https://apps.cervicalcheck.ie/screening-locations/cervical-screening_ireland.588.0.findsmeartakersearch.html), both of which are freely available to the public. The participant information sheet (Refer to Appendix 4) explained the purpose of the research, their role, and how the data they provided would subsequently be used. It also provided information regarding participation, including benefits and disadvantages of taking part as well as issues such as confidentiality and anonymity. Participants were assured of their ability to withdraw at any time, prior to publication. A total of 711 GPs from 381 practices across Ireland were invited to participate in the study. Every practice that provided an email address was contacted to maximise the

response rate as previous studies (Bock, Diehm, & Schneider, 2012; Watson et al., 2013) of this kind have shown low responses rates. Ethical approval was obtained from the Faculty of Life Sciences Research Ethics Committee at the University of Chester, UK (Refer to Appendix 1). Participants provided consent by completing and submitting the questionnaire.

2.3. Procedures

Questionnaires were issued electronically via email in April 2015. They contained a hyperlink to the questionnaire based online on BOS (https://www.onlinesurveys.ac.uk/). A second reminder was sent to non-responders in May, followed by a third and final reminder in June.

2.4. Statistical Analyses

The IBM SPSS (Statistical Package for the Social Sciences) statistics software package (Version 22.0) was used to analyse the data. The Spearman's Rank Coefficient and Chi-Squared Test for Association were used to test the hypotheses depending on the level of the data being tested.

Chapter 3: Results

3.1. Demographics

A total of 80 questionnaires were returned giving a response rate of 11%, similar to that of Bock et al. (2012). The personal characteristics of GPs who participated in the study are described in Table 3.

Table 3: *Personal characteristics of GPs who participated*

Variable	**Study Sample** (*n* = 80)
Gender, *n* (%) (*n* = 77)	
Male	41 (51.25%)
Female	36 (45%)
Not stated	3 (3.75%)
Age (y), *n* (%) (*n* = 74)	
<35	5 (6.8%)
35-44	22 (29.7%)
45-54	21 (28.4%)
>54	26 (35.1%)
Type of practice, *n* (%)	
Private Practice	29 (35.4%)
Private Group Practice	34 (41.5%)
Public Hospital	1 (1.2%)
Public Health Centre	18 (22%)
Years in Practice, median (min - max) (*n* = 79)	23 yr (2 – 42 yr)

Variable	Study Sample (*n* = 80)
Number of patients seen each week, median (min - max) (*n* = 78)	100 patients (40 – 360 patients)
Hours worked per week, median (min - max) (*n* = 78)	40hr (8 – 80hr)
Completed a course or special training related to exercise science or exercise counselling, *n* (%)	3 (3.9%)

3.2. Level of physical activity promotion

Table 4 illustrates the frequency with which GPs encouraged their patients to lead a more physically active lifestyle in the previous month.

Table 4: *Frequency with which Irish GPs encouraged their patients to lead a more physically active lifestyle in the previous month*

Frequency of PA promotion	*n* (%)
Never	0
Rarely (<10% of patients)	2 (3%)
Sometimes (10-30% of patients)	24 (30%)
Often (31-50% of patients)	33 (42%)
More Often (>70% of patients)	20 (25%)

From the GPs (n = 20) who reported encouraging more than 70% of their patients, 14 were female while only five were male (one GP failed to state their gender).

Furthermore, of the GPs who reported encouraging their patients ‘Sometimes’ (10 - 30% of patients), 20 were male while just two were female. Similar findings occurred amongst both genders on encouragement of their patients ‘Often’ (31 - 50% of patients) (16 Males Vs 17 Females). There was no significant relationship between GPs’ gender and frequency of promoting PA, however, there was a strong likelihood of an association between gender and frequency of promoting PA (Likelihood Ratio, p = .000) (Refer to Table A1 in Appendix 5).

3.3. Conditions for which GPs provide PA advice to their patients

Figure 3 illustrates the frequency with which GPs provide PA advice to patients with various conditions.

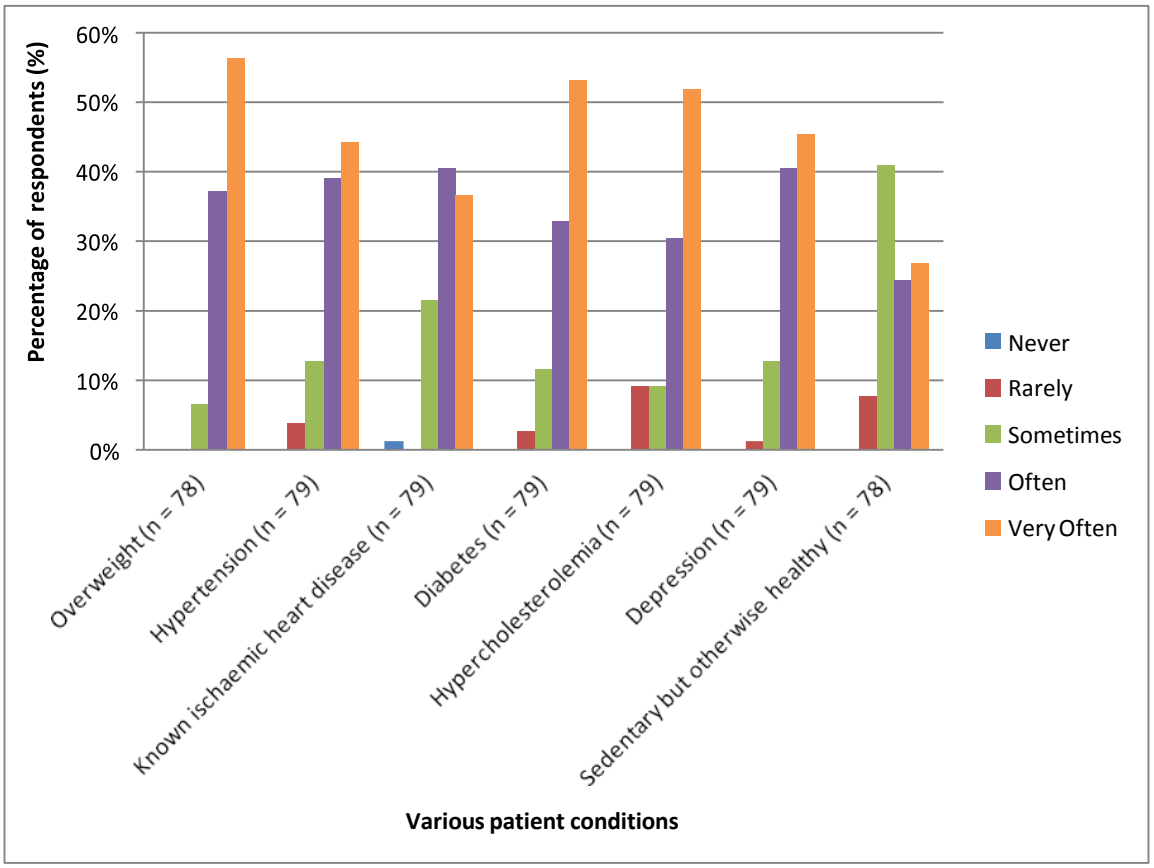

Figure 3: *How often GPs provide PA advice to patients with various conditions*

The condition for which GPs most frequently give PA advice is 'Overweight' patients. This is followed by 'Diabetes', 'Depression', 'Hypertension', and 'Hypercholesterolemia'. 'Known ischaemic heart disease' (IHD) had a somewhat lower incidence of advice, however, 'Sedentary but otherwise healthy' patients was considerably lower as just over half of the respondents reported that they would provide PA advice to these patients, with the median response being 'Often'.

Besides being the least frequent condition for which GPs give PA advice, the percentage of GPs who provide PA advice to sedentary patients often (24%) and very often (27%) is lowest out of all conditions.

3.4. Barriers to physical activity promotion

Figure 4 illustrates GPs' responses to barriers which frequently prevent them from promoting a physically active lifestyle amongst their patients.

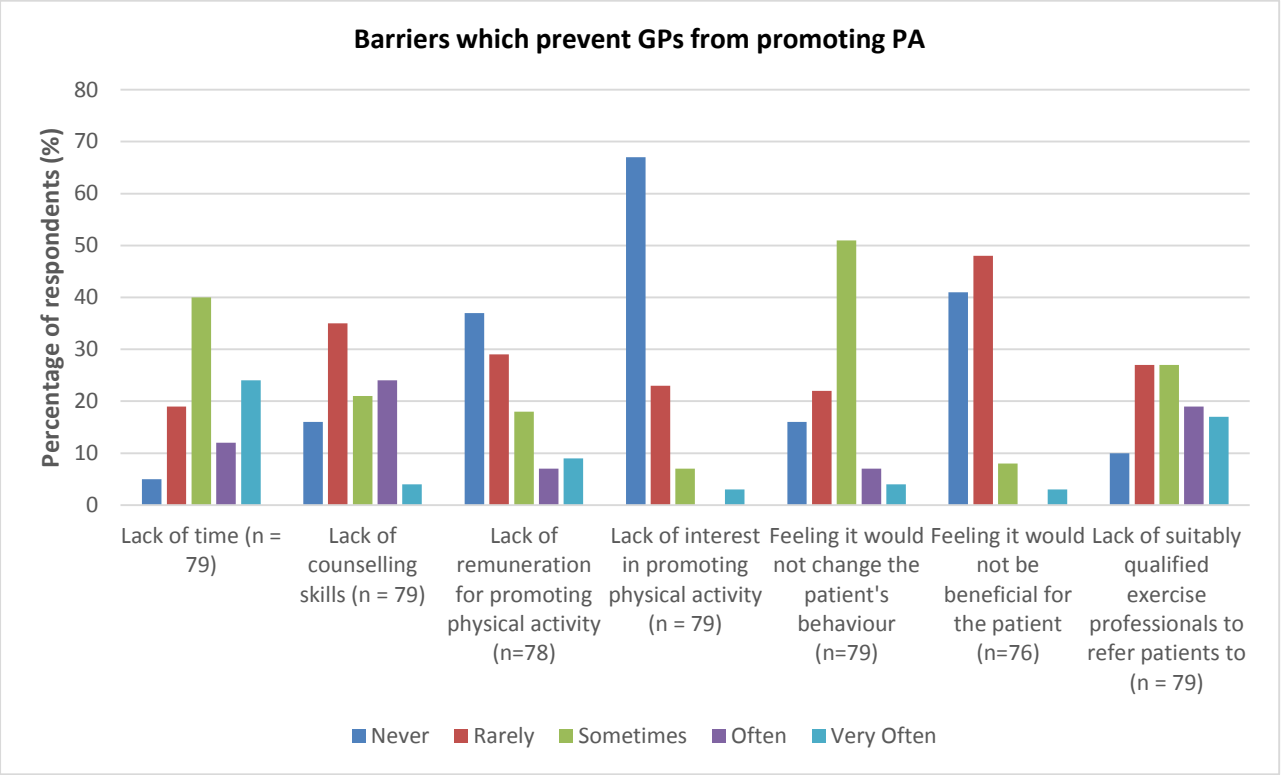

Figure 4: *Frequency of barriers which prevent GPs from promoting a physically active lifestyle amongst their patients*

The most common barrier reported by GPs was 'Lack of time' as the majority of respondents (85%, *n* =77) cited that this 'Sometimes', 'Often' or 'Very Often' prevented them from promoting a physically active lifestyle amongst their patients. 9% of GPs cited 'Other' barriers including, but not limited to, the lack of an appropriate referral pathway, the expense of exercise programmes, not being equipped with exercise promotion literature and significant patient disability.

3.5. GPs' physical activity levels

Table 5 illustrates how GPs rated their own PA levels compared to other Irish people of the same sex and age.

Table 5: *How GPs rated their own PA level compared to other Irish people of the same sex and age (n = 80)*

PA levels	***N* (%)**
Much more active	34%
Slightly more active	28%
About the same	20%
Slightly less active	9%
Much less active	9%

The majority of GPs (62%, *n* = 50) believed that they are more active (Much more active/Slightly more active) compared to other Irish people of the same age and sex while 20% (*n* = 16) believed they are 'About the same' and 18% (*n* = 14) 'Slightly less active' or 'Much less active'. The median response to this question was 'Slightly more active'. There was no relationship between GPs' ratings of their own PA levels compared to other Irish people of the same sex and age and frequency of promoting PA (*p* = .942, *r* = -.008) (Refer to Table A12 in Appendix 5), however, there was a significant, but low, negative correlation between GPs own PA levels compared to other Irish people of the same sex and age and their overall confidence score (*p* = .004, *r* = -.318) (Refer to Table A13 in Appendix 5). Furthermore, there was a significant, moderate correlation between GPs' own PA levels compared to other Irish people of the same sex and age and their confidence in giving general PA advice (*p* = .000, *r* = .445) and a significant, moderate correlation between GPs own

PA levels compared to other Irish people of the same sex and age and their confidence in suggesting specific PA programmes (p = .000, r = .466) (Refer to Tables A14 - A15 in Appendix 5).

3.6. GPs' confidence in promoting physical activity

Figure 5 illustrates GPs' responses to the two statements regarding their confidence in promoting PA.

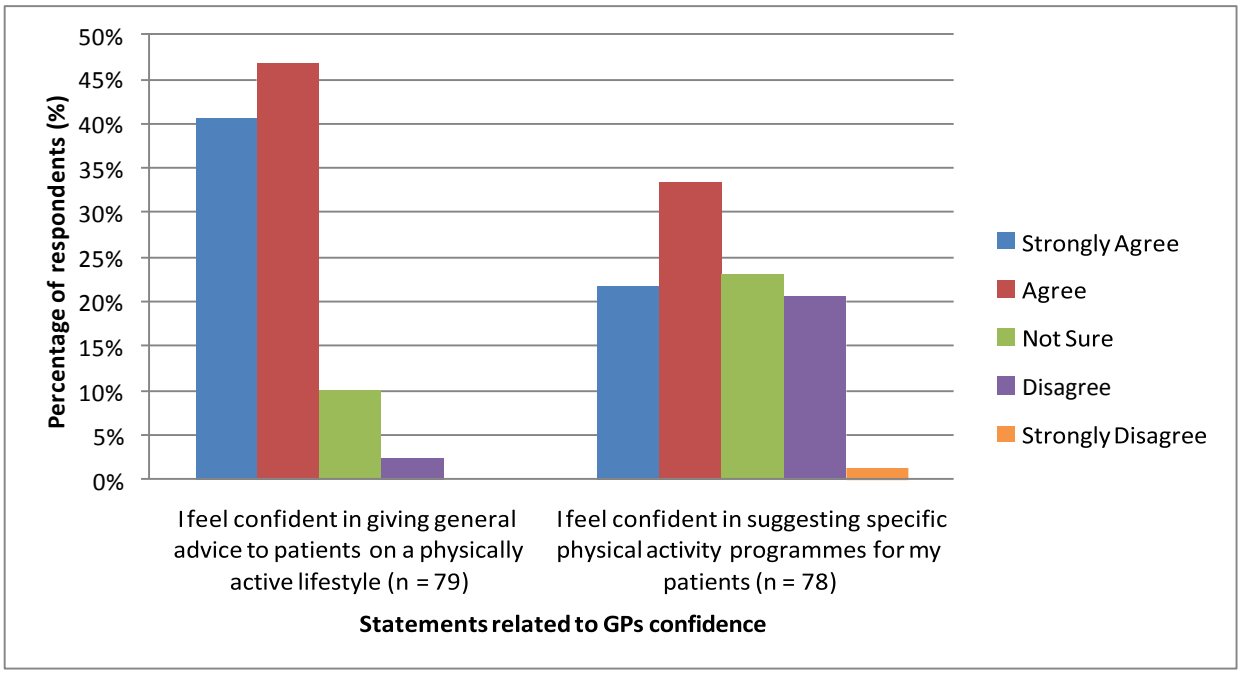

Figure 5: *GPs' responses to two statements related to their confidence in promoting PA*

The majority of GPs (88%, n = 69) agreed that they felt confident in giving general advice to patients on a physically active lifestyle, however, regarding their confidence in suggesting specific physical activity programmes for patients, this varied greatly as just over half (55%, n = 43) of the GPs agreed, while 23% (n = 18) of GPs were unsure and 22% (n = 17) disagreed. Figure 6 shows the GPs' overall confidence score based on the two statements testing their confidence in promoting PA. The median score was two out of a maximum score of two (minimum 0, maximum 2).

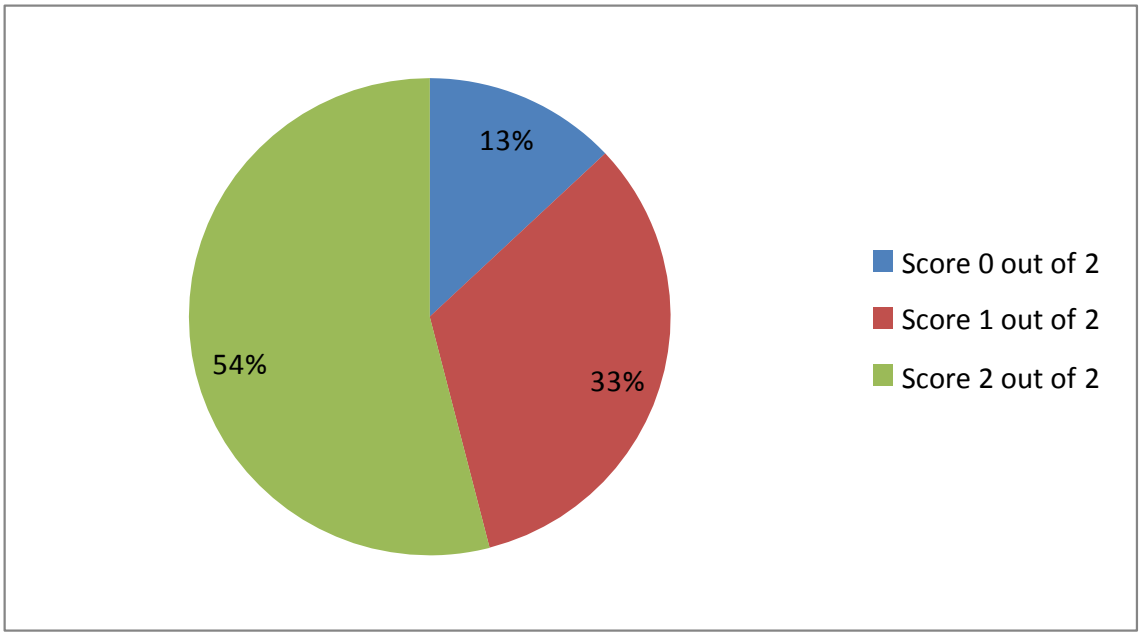

Figure 6: *GPs' confidence score based on two statements to test their confidence in promoting PA (n = 79)*

There was no relationship between GPs' overall confidence score and the frequency of promoting PA (p = .434, r = .089) (Refer to Table A9 in Appendix 5). However, there was a significant, but low correlation between GPs' confidence in giving general advice to patients about a physically active lifestyle and the frequency of promoting PA (p = .006, r = -.306) and a significant, low correlation between GPs confidence in suggesting specific PA programmes for their patients and the frequency of promoting PA (p = .012, r = -.282) (Refer to Tables A10 - A11 in Appendix 5).

3.7. GPs' knowledge of physical activity recommendations

Figure 7 illustrates the percentage for each type of answer given by GPs who claimed to know the national PA recommendation for Irish adults.

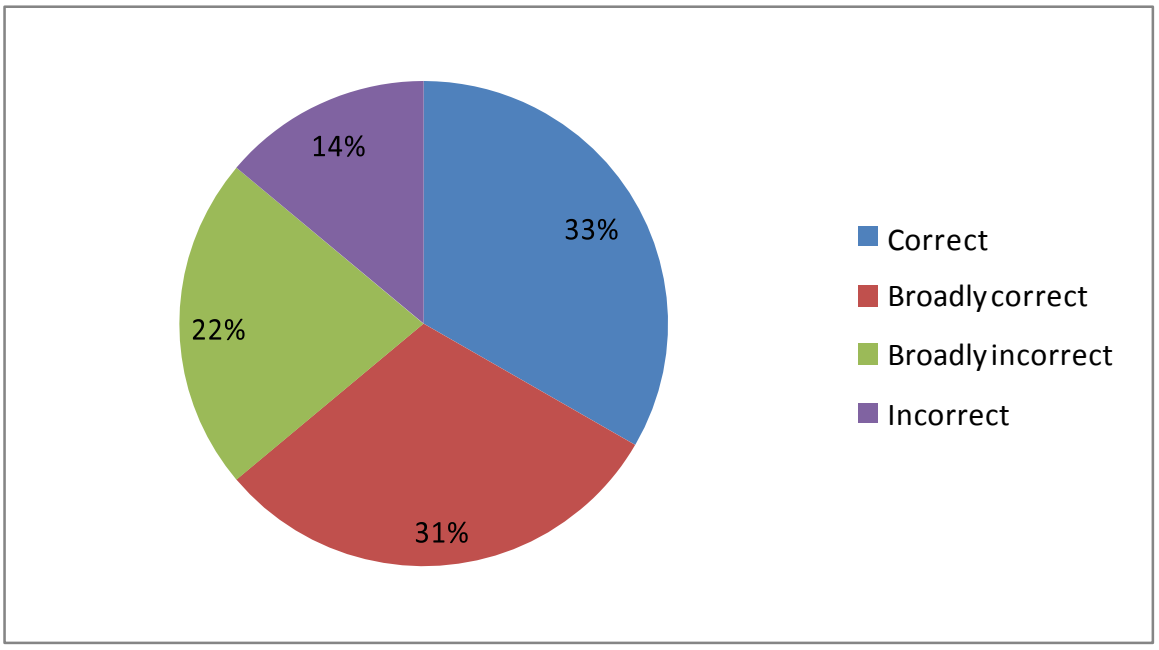

Figure 7: *Percentage of correct versus incorrect answers given by GPs who claimed to know the national PA recommendation for Irish adults*

Although 33 respondents indicated that they were aware of the PA recommendations, just 12 of these respondents correctly cited the PA recommendations, however, since some of the answers in the description of the PA recommendations for Irish adults were not entirely specific, four categories (correct, broadly correct, broadly incorrect and incorrect) were established to give a better representation of GPs' knowledge of PA recommendations. The total proportion of respondents who know the national PA recommendation for Irish adults was 30% (n = 24), meaning that 70% (n = 55) of respondents provided an incorrect answer and/or stated they were not aware of the PA recommendations. There was no relationship between GPs' knowledge of the PA recommendations and frequency of promoting PA (p = .143) (Refer to Table A2 in Appendix 5).

3.8. GPs' knowledge of physical activity required for health benefits

Figure 8 illustrates GPs' responses to four statements related to their knowledge of PA required for health benefits.

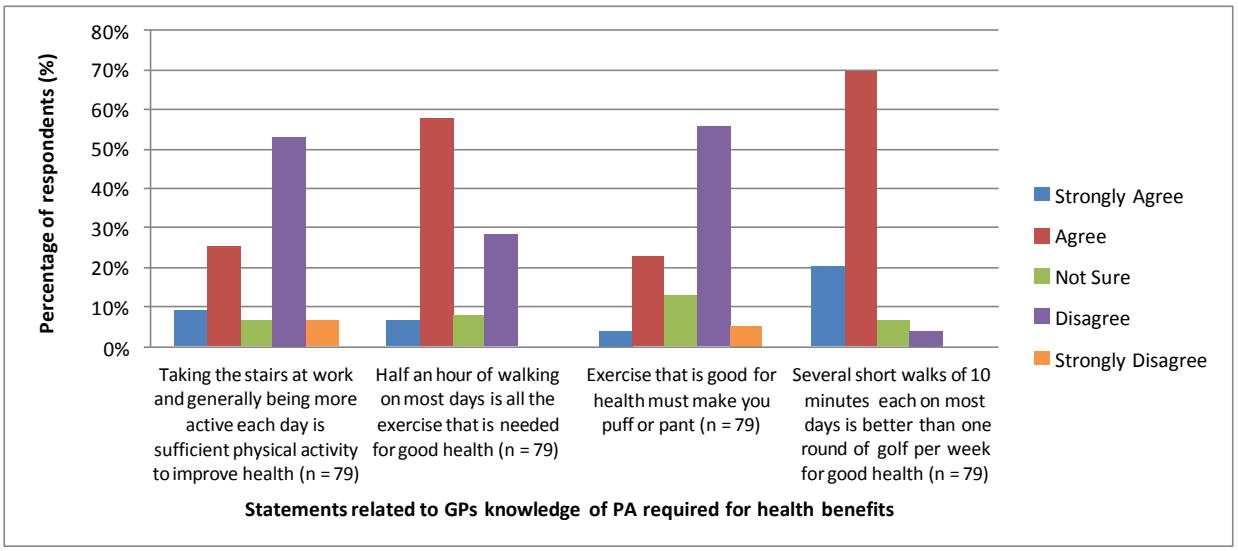

Figure 8: *GPs' responses to four statements related to their knowledge of PA required for health benefits*

A small percentage of GPs who knew the PA recommendation answered each statement correctly (30% Agree/Strongly Agree vs. 70%; 32% Agree/Strongly Agree vs. 68%; 25% Disagree/Strongly Disagree vs. 73%; 32% Agree/Strongly Agree vs. 68% respectively). Out of a total of 79 respondents, only 30% (*n* = 24) were able to give the correct PA recommendation for Irish adults. Examining these numbers further shows that only four out of these 24 GPs (5%) were able to give the correct recommendation and answer the four statements correctly. In addition, of all 79 respondents, just eight GPs were able to give the correct answer to the four statements, however, stated that they did not know the PA recommendation for Irish adults.

Figure 9 shows GPs' overall knowledge score based on four statements to test their knowledge of PA required for health benefits. The median score was two out of a maximum score of four (minimum 0, maximum 4).

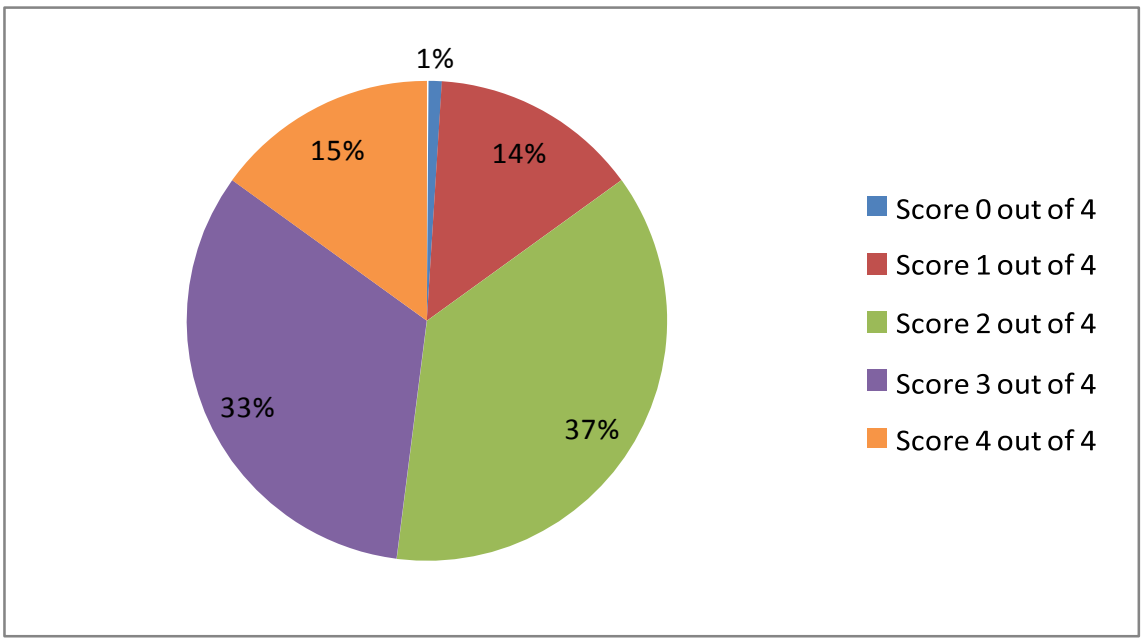

Figure 9: *GPs' knowledge score based on four statements to test their knowledge of PA required for health benefits (n = 79)*

No relationship was found between GPs' overall knowledge score and frequency of PA promotion (p = .939, r = .009) (Refer to Table A3 in Appendix 5). Furthermore, there is no significant connection between GPs' responses to the four statements on knowledge of PA required for health benefits and frequency of promoting PA (p = .981, p = .343, p = .074, p = .566, respectively) (Refer to Tables A4 - A7 in Appendix 1). In addition, there is no relationship between GPs who have completed a course or special training related to exercise science or exercise counselling and frequency of promoting PA (p = .953) (Refer to Table A8 in Appendix 5). Then again, out of 77 respondents, only 4% (n = 3) had completed such a course.

3.9. GPs' role perception regarding physical activity promotion

Figure 10 illustrates GPs responses to three statements relating to their role perception in PA promotion.

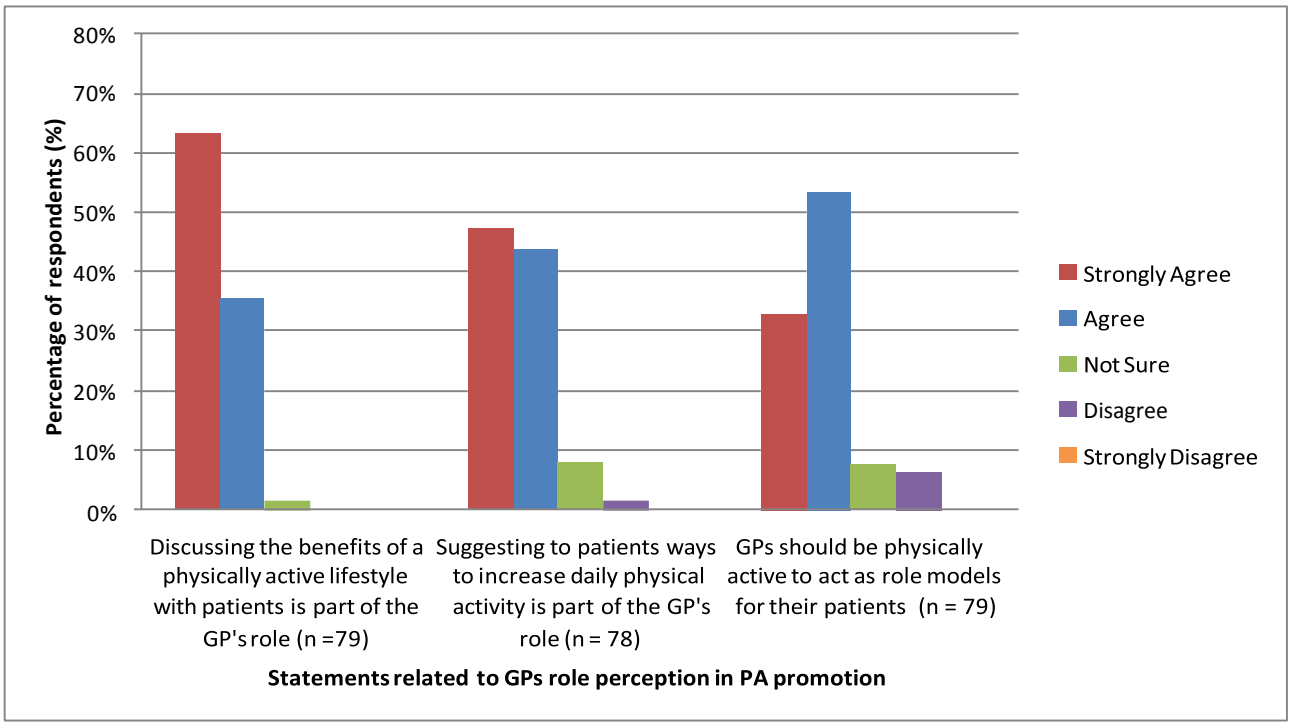

Figure 10: *GPs' responses to three statements relating to their role perception in PA promotion*

Figure 11 shows GPs' overall role perception score based on the three statements. The median score was three out of a maximum score of three (minimum 0, maximum 3).

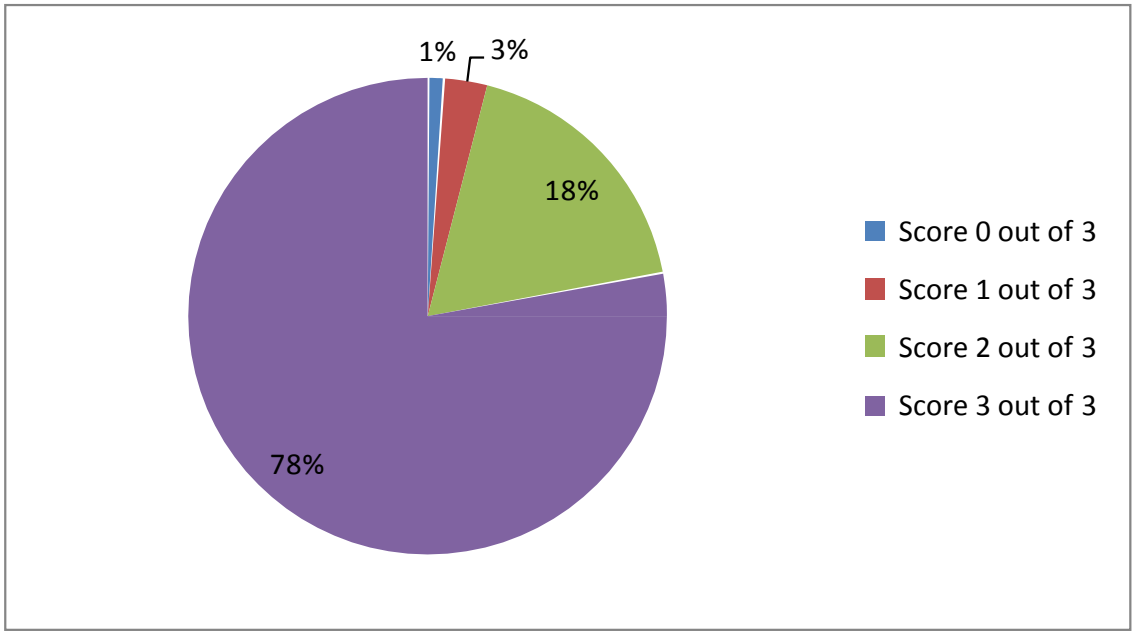

Figure 11: *GPs' role score based on three statements to test their role perception regarding PA promotion*

3.10. Strategies for implementation of physical activity promotion in general practice

Figure 12 illustrates GPs' responses to different types of strategies they would consider feasible/unfeasible in delivering to their patients to promote PA.

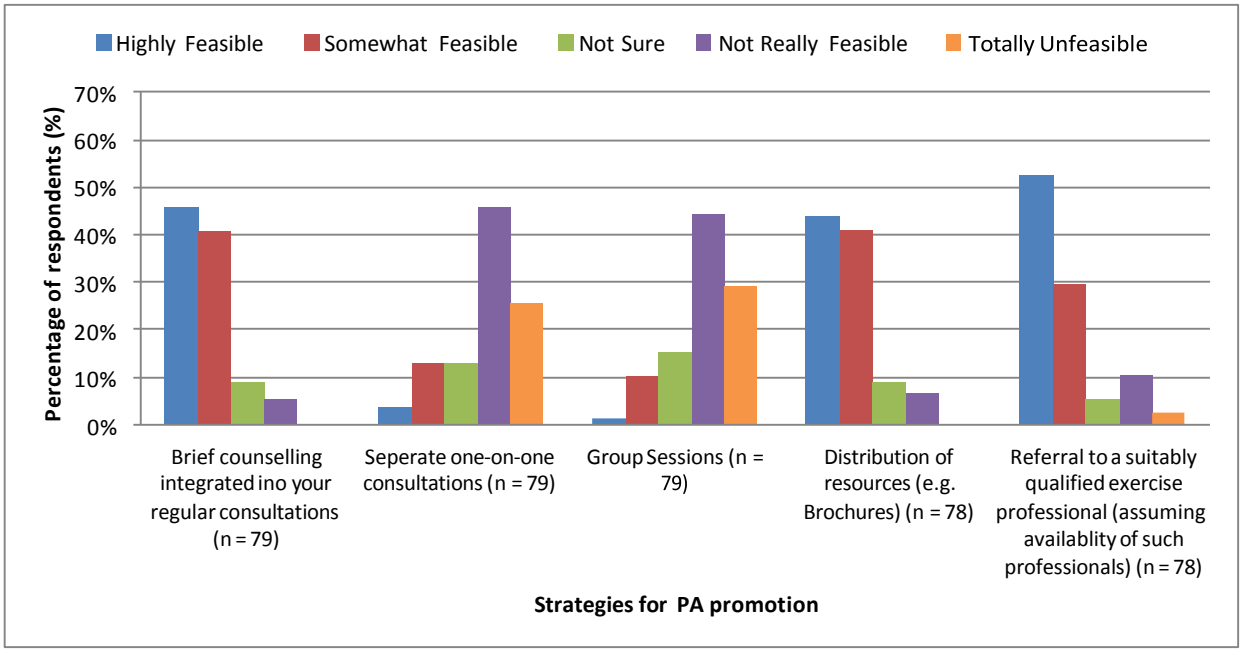

Figure 12: *How feasible GPs consider different types of strategies for PA promotion*

'Brief counselling integrated into regular consultations' was considered the most feasible by GPs, whereas, 'Separate one-on-one consultations' and 'Group sessions' were considered the least feasible.

Chapter 4: Discussion

This study has analysed Irish GPs' knowledge, attitudes, and self-reported practices of promoting and recommending PA in Ireland.

4.1. GPs' PA promotion practices

The primary finding is that the level of PA promotion by Irish GPs is somewhat high (67%), however, based on the fact that the GPs' knowledge of the PA recommendation for Irish adults was poor (Refer to section 3.3), the actual levels of PA promotion by Irish GPs remains highly questionable. This study shows similar results to previous research (Bock et al., 2012; Douglas, Torrance, van Teijlingen, Meloni, & Kerr, 2006) in the level of PA promotion. In Germany, Bock et al. (2012) found that PA assessment and advice occurred in 55% of GPs, with this study also sharing a similar response rate (13.3%) to the current study (11%). Compared to Calleja (2011) and other studies (Watson et al. 2013; Jørgensen, Nordentoft, & Krogh, 2012; Ribera, Mckenna, & Riddoch, 2005) however, the level of PA promotion was not as high. GPs' gender was an influential factor in the current study because from the GPs (n = 20) who reported encouraging 'More Often' (> 70% of patients), 14 of these GPs were female while only five GPs were male (one GP failed to state their gender). Although one has to keep in mind that this study used percentages instead of numbers, it is difficult to compare this study to Calleja (2011) as percentages may offer a better representation of the level of PA promotion by GPs.

As expected from previous research (Lawlor et al., 1999; Calleja, 2011; Watson et al., 2013), the condition for which Irish GPs most frequently gave PA advice, was overweight patients, as the majority of respondents (94%, *n* = 73) indicated that they would often or very often provide PA advice for this condition. Moreover, Irish GPs, like Maltese GPs (Calleja, 2011), are more likely to promote PA if they perceive it to be relevant to the patient's condition (secondary prevention), rather than routinely with all patients (primary prevention). This is in contrast to Douglas et al. (2006) who found that most primary care staff routinely discussed and advised patients about PA, regardless of the condition (primary prevention). This study however, included both practice nurses (PNs) and health visitors (HV) in addition to GPs.

Besides the patient's condition being a factor influencing whether or not the GP gives PA advice, there are also external barriers. The most common barrier reported by the GPs was a lack of time. 85% (*n* = 77) of respondents indicated that this 'Sometimes', 'Often', or 'Very Often' prevented them from promoting a physically active lifestyle amongst their patients. This is frequently reported by GPs as the main barrier in the research (McKenna, Naylor, & McDowell, 1998; Lawlor et al. 1999; Brotons et al., 2005; Ribera et al., 2005; Douglas et al., 2006; Calleja, 2011).

There was no relationship found between Irish GPs' ratings of their own PA levels compared to other Irish people of the same sex and age and frequency of promoting PA. This is despite the fact that the majority of the GPs regarded themselves as being much more or slightly more active. This contradicts the strong evidence found in the relationship between GPs' own PA habits and frequency of promoting PA (McKenna et al., 1998; Brotons et al., 2005; Ribera et al., 2005; Sammut, 2006).

Furthermore, several review papers (Lobelo, Duperly, & Frank, 2009; Fie, Norman, & While, 2012; Hébert, Caughy,& Shuval, 2012; Vuori, Lavie, & Blair, 2013) agree on the research that GPs who exercise regularly are more likely to counsel and promote PA amongst their patients and provide better counselling and motivation. A possible reason why there was no relationship found is the low number of participants (*n* = 80) and in addition, there might be cause to look into the relationship this has with the GPs' overall confidence in providing PA advice as results showed that there were significant correlations.

The majority (88%, *n* = 69) of GPs felt confident in giving general advice to patients on a physically active lifestyle, however, when it came to suggesting specific PA programmes for patients, the GPs' confidence was somewhat lower (55%, *n* = 43). This was a similar finding to the study in Malta; in addition, this also supports the work of several others (Bull, Schipper, Jamrozik, & Blanksby, 1997; Lawlor et al., 1999; Douglas et al., 2006; van der Ploeg et al., 2007; Buffart et al., 2009) who found that GPs' confidence in promoting PA is high but differs between general and specific advice.

4.2. GPs' knowledge of PA

As previously mentioned, this study shows that Irish GPs' knowledge of the national PA recommendation for Irish adults is somewhat poor. These results support previous research (Walsh, Swangard, Davis, & McPhee, 1999; Douglas et al., 2006; Calleja, 2011) where GPs' knowledge of PA recommendations was found to be low. Nevertheless, compared to these other studies, Irish GPs' knowledge of the national PA recommendation was somewhat better. In Malta, only 19% of GPs knew either the Maltese or the United Kingdom's PA recommendations (Calleja, 2011), while in Scotland, just 13% of GPs correctly described the current recommendations (Douglas et al., 2006). Although this study found no relationship between knowledge of the PA recommendations and frequency of promoting PA, Walsh et al. (1999) found that GPs were somewhat more likely to engage in regular exercise counselling if they knew the recommendation (62% vs. 40%, p = .06). Perhaps if there was a larger sample size and better response rate, like that of Walsh et al. (1999) (n = 175, 54% response rate) and Calleja (2011) (n = 156, 53% response rate), a relationship may have been found.

Despite Irish GPs' knowledge of the PA recommendations being low, it appears that their knowledge of PA required for health benefits is somewhat adequate. Only 34% of GPs' responses agreed (Agree/Strongly Agree) that taking the stairs at work and generally being more active each day was sufficient PA to improve health while 59% disagreed (Disagree/Strongly Disagree). This result reflects that of Buffart et al. (2009), where in 1997, only 30% (n = 150) agreed with the statement. While both Buffart et al. (2009) and Watson et al. (2013) found that most GPs believed vigorous activity was necessary to acquire health benefits, this study showed that most (61%) GPs believed it was not, which makes it surprising that GPs answered the first

statement incorrectly. Moreover, there were considerably more GPs who answered each statement correctly that did not know the PA recommendation for Irish adults compared to GPs who did know the PA recommendation. This again raises doubt to the true levels of PA promotion by Irish GPs. The results of this study support previous findings (Lawlor et al., 1999; Buffart et al., 2009; Calleja, 2011; Watson et al., 2013) where, in general, GPs' knowledge of PA required for health benefits were found to be good, but many seemed uncertain with regards to the intensity that is required.

4.3. GPs' attitudes towards PA promotion

The results in this study reveal that Irish GPs have a very high role perception towards PA promotion. The vast majority of respondents agreed with the three statements which assessed their role perception towards PA promotion and this to some extent, is consistent with the high levels of PA promotion found by the GPs. These results support the work of many others (Bull et al., 1997; van der Ploeg et al., 2007; Buffart et al., 2009; Calleja, 2011; Watson et al., 2013), however, it contradicts the finding that most Irish GPs do not routinely advise sedentary but otherwise healthy patients (primary prevention). Brief counselling integrated into regular consultations was considered the most feasible type of strategy the GPs would consider to encourage and promote PA (86%), closely followed by distribution of resources (85%). Similarly, Calleja (2011) found that brief counselling integrated into regular consultations was considered the most feasible type of strategy (95%), though this was followed by referral to a suitably qualified exercise professional (79%). This was the third most popular strategy that the GPs in this study considered to be most feasible but only recently, the GP Exercise Referral Programme (2015) in Ireland was discontinued and GPs are no longer referring their patients under the programme and local coordinators

of leisure facilities are no longer accepting referrals as a result.

4.4. Study limitations

The main limitation of this study was the small sample size and low response rate, however despite these limitations; the study shared a similar response rate to that of other studies (Bock et al., 2012; Watson et al., 2013). The small sample size limited the power of the study and the results achieved and so therefore this study may not be reflective of Ireland as a whole. Furthermore, due to the low response rate, selection bias may have occurred; as GPs who are more interested in PA and exercise may have been more likely to participate in the study.

Chapter 5: Conclusion

This study raises doubt as to the true levels of PA promotion by Irish GPs amongst their patients, and highlights that many of them do not know and/or are unaware of the national PA recommendations. This causes great concern given the current health of the nation as a whole and the prediction that Ireland is heading for a serious overweight and obesity crisis in the next fifteen years. It is imperative that Irish GPs are at the forefront of the battle to beat this crisis. Irish GPs need to be routinely promoting PA with all their patients (primary prevention), and not just when they perceive this as relevant to the patient's condition (secondary prevention). This cannot be emphasized enough. Promoting PA routinely amongst patients should be an integral part of their routine advice and every GP should understand and recognize the significance of this for their patients. Strategies are urgently needed to raise awareness and help Irish GPs become more successful in this role so that they have the required knowledge and tools to help them. This will then allow them to promote PA in a way that will have a positive effect on their patients and make a significant public health impact.

The Irish government and the HSE are fundamental to the implementation of this strategy. Based on studies carried out to date and with the help of this research, it is hoped that this topic will be prioritised urgently before it is too late. A budget must be provided if the government are to bring this to the next level and start making the difference the research shows that it can.

Based on the results of this research showing GPs knowledge of PA recommendations, training and development for GPs in this area is crucial. The creation of a "Best Practice" guideline document for GPs based on this research is one way that this recommendation could be implemented.

Given the results of this research which show the severity of this nationwide crisis, these are the recommendations for further research:

- Investigating the experience of Irish patients under this heading;

This would give a 360 degree view of the situation. Comparing patient experience against that of GPs will hopefully enlighten the way forward.

- Increased sample size and response rate;

For a research to be as representative of Ireland, it is crucial to have access to the experience of as many GPs as possible. If more time is taken with appropriate funding and the weight of the authorities behind it, this goal should be achievable. It is also imperative that this is done on an ongoing basis so that improvements as a result of the action that is taken can be measured, what gets measured gets done.

- Do more in-depth research into the GPs knowledge of PA requirements.

In order to improve the GPs knowledge of PA requirements we need to fully understand in detail what extra knowledge, tools and resources GPs need to fully engage in this crucial initiative.

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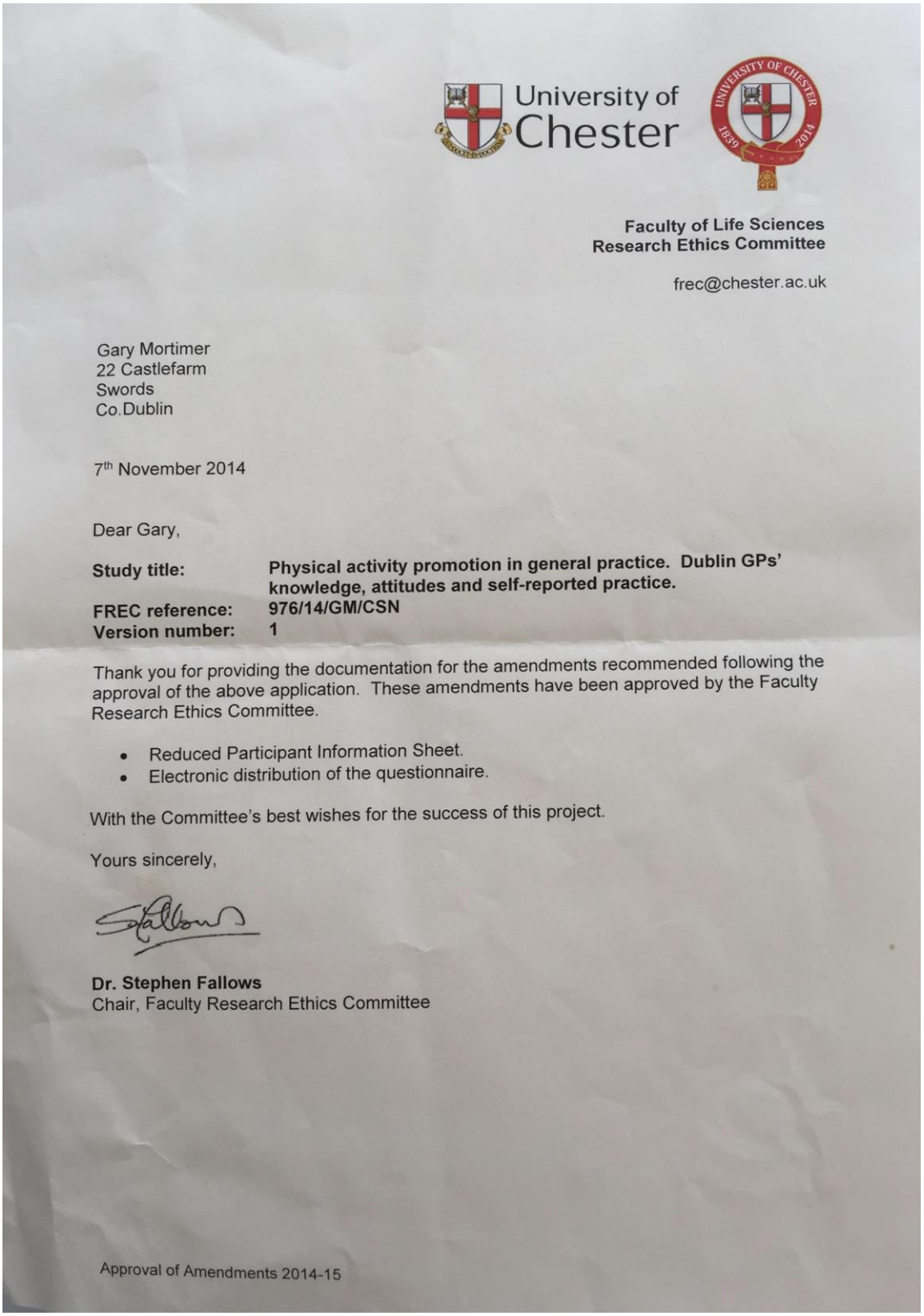
Appendices

Appendix 1 – Ethical approval



University of Chester

Faculty of Life Sciences
Research Ethics Committee

frec@chester.ac.uk

Gary Mortimer
22 Castlefarm
Swords
Co.Dublin

7th November 2014

Dear Gary,

Study title: **Physical activity promotion in general practice. Dublin GPs' knowledge, attitudes and self-reported practice.**
FREC reference: **976/14/GM/CSN**
Version number: **1**

Thank you for providing the documentation for the amendments recommended following the approval of the above application. These amendments have been approved by the Faculty Research Ethics Committee.

- Reduced Participant Information Sheet.
- Electronic distribution of the questionnaire.

With the Committee's best wishes for the success of this project.

Yours sincerely,

Dr. Stephen Fallows
Chair, Faculty Research Ethics Committee

Approval of Amendments 2014-15

Appendix 2 – Questionnaire

GP SURVEY 2015

Introduction

Physical Activity Promotion in General Practice

Physical activity includes any activity from a low intensity level, such as walking, to a high intensity level, such as playing a competitive sport.

1 How often did you encourage your patients to have a more physically active lifestyle in the **last month**?

- Never
- Rarely, <10% of patients
- Sometimes, 10-30% of patients
- Often, 31-50% of patients
- More often , >70% of patients

To what extent do you agree or disagree with the following statements.

2 Taking the stairs at work and generally being active each day is sufficient physical activity to improve health.

- Strongly Agree
- Agree
- Not Sure
- Disagree
- Strongly Disagree

3 Half an hour of walking on most days is all the exercise that is needed for good health.

- Strongly Agree
- Agree
- Not Sure
- Disagree
- Strongly Disagree

4 Exercise that is good for health must make you puff and pant.

- Strongly Agree
- Agree
- Not Sure
- Disagree
- Strongly Disagree

5 Several short walks of 10 minutes each on most days is better than one round of golf per week for good health.

- Strongly Agree
- Agree
- Not Sure
- Disagree
- Strongly Disagree

6 Discussing the benefits of a physically active lifestyle with patients is part of the GP's role.

- Strongly Agree
- Agree
- Not Sure
- Disagree
- Strongly Disagree

7 Suggesting to patients ways to increase daily physical activity is part of the GP's role.

- Strongly Agree
- Agree
- Not Sure
- Disagree
- Strongly Disagree

8 I feel confident in giving general advice to patients on a physically active lifestyle.

- Strongly Agree
- Agree
- Not Sure
- Disagree
- Strongly Disagree

9 I feel confident in suggesting specific physical activity programmes for my patients.

- Strongly Agree
- Agree
- Not Sure
- Disagree
- Strongly Disagree

10 GPs should be physically active to act as a role model for their patients.

- Strongly Agree
- Agree
- Not Sure
- Disagree
- Strongly Disagree

How often do you provide physical activity advice to patients who present with the following conditions?

11 Overweight

- Never
- Rarely
- Sometimes
- Often
- Very Often

12 Hypertension

- Never
- Rarely
- Sometimes
- Often
- Very Often

13 Known ischaemic heart disease

- Never
- Rarely
- Sometimes
- Often
- Very Often

14 Diabetes

- Never
- Rarely
- Sometimes
- Often
- Very Often

15 Hypercholesterolemia

- Never
- Rarely
- Sometimes
- Often
- Very Often

16 Depression

- Never
- Rarely
- Sometimes
- Often
- Very Often

17 Sedentary but otherwise healthy

- Never
- Rarely
- Sometimes
- Often
- Very Often

How often does the following prevent you from promoting a physically active lifestyle in your patients?

18 Lack of time

- Never
- Rarely
- Sometimes
- Often
- Very Often

19 Lack of counselling skills

- Never
- Rarely
- Sometimes
- Often
- Very Often

20 Lack of remuneration for promoting physical activity

- Never
- Rarely
- Sometimes
- Often
- Very Often

21 Lack of interest in promoting physical activity

- Never
- Rarely
- Sometimes
- Often
- Very Often

22 Feeling it would not change the patient's behaviour

- Never
- Rarely
- Sometimes
- Often
- Very Often

23 Feeling it would not be beneficial for the patient

- Never
- Rarely
- Sometimes
- Often
- Very Often

24 Lack of suitably qualified exercise professionals to refer patients to

- Never
- Rarely
- Sometimes
- Often
- Very Often

25 Other (*Please specify*)

What kinds of physical activity promotion would be feasible for you to deliver to your patients?

26 Brief counselling integrated into your regular consultations

- Highly Feasible
- Somewhat Feasible
- Not Sure
- Not Really Feasible
- Totally Unfeasible

27 Separate one-on-one consultations

- Highly Feasible
- Somewhat Feasible
- Not Sure
- Not Really Feasible
- Totally Unfeasible

28 Group sessions

- Highly Feasible
- Somewhat Feasible
- Not Sure
- Not Really Feasible

- Totally Unfeasible

29 Distribution of resources (e.g. brochures)

- Highly Feasible
- Somewhat Feasible
- Not Sure
- Not Really Feasible
- Totally Unfeasible

30 Referral to a suitably qualified exercise professional (*assuming availability of Such professionals*)

- Highly Feasible
- Somewhat Feasible
- Not Sure
- Not Really Feasible
- Totally Unfeasible

Some general questions about your practice:

31 Average number of patients you see each week:

32 Your number of years in practice

33 Your sex

34 Your age in years

35 Usual number of hours worked each week

36 The town/village(s) where you work?

37 In what kind of practice do you work?

- Private Practice
- Private Group Practice

- [ ] Private Hospital
- [ ] Public Hospital
- [ ] Public Health Centre

38 Have you ever completed a course or special training related to exercise science or exercise counselling?

39 Are you aware of the national physical activity recommendation for Irish adults?

A If yes, please describe the national physical activity recommendation for Irish adults here.

Finally, about your own physical activity:

40 How physically active do you think you are currently compared with other Irish people of your sex and age?

- ○ Much more active
- ○ Slightly more active
- ○ About the same
- ○ Slightly less active
- ○ Much less active

41 On average, for approximately how long are you physically active each week? (Please answer in hours and minutes)

Physical activity includes any activity from a low intensity level, such as walking, to a high intensity level, such as playing a competitive sport.

Questionnaire adapted from:

Calleja, J. (2011). *Promoting physical activity in general practice: Maltese GPs' beliefs, attitudes and practices.* (Unpublished master's thesis). University of Chester, United Kingdom.

THANK YOU for participating in this research.

Appendix 3 – Letter of invitation

Physical activity promotion in general practice: Irish GPs' knowledge, attitudes and self-reported practice

My name is Gary Mortimer and I am studying for my MSc in Exercise and Nutrition Science at the University of Chester [http://www.chester.ac.uk/postgraduate/ens-dublin]. I am extremely passionate about physical activity and promoting a healthy lifestyle.

I am currently conducting my MSc Research project where I am investigating Irish general practitioner's (GPs) views on physical activity.

I would like to invite you to take part in my research project because you are a GP currently practising in Ireland. The research consists of a questionnaire which should take about 5 minutes to complete.

All questionnaires will be anonymous and only be reviewed by myself and my project supervisor.

When the survey has been completed, please send me a quick email [1322383@chester.ac.uk] confirming this so that I will be able to share the results with you later in the year. The results of the study will be given to all participants in a strictly confidential manner which I am sure will be of great interest to all GPs'.

Further details about my project can be found in the attached document

Please find below a link to the confidential project questionnaire; this will open a new window in your browser.
[https://chester.onlinesurveys.ac.uk/gp-survey-2015-2]

If you require any further information concerning this research, please feel free to contact me via email (1322383@chester.ac.uk) or my research supervisor, Dr Stephen Fallows using the following address s.fallows@chester.ac.uk

I greatly appreciate your participation in this study.

Thanks for your help

Gary

Appendix 4 – Participant information sheet

Participant information sheet

University of Chester

Physical activity promotion in general practice: Irish GPs' knowledge, attitudes and self-reported practice

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

What is the purpose of the study?

The purpose of this research is to determine general practitioners (GPs) knowledge of, attitude to, and self-reported practice of promoting and recommending physical activity in Ireland. The objective is to gain a better understanding of the percentage of GPs that adhere to this role and if not, why not.

Why have I been chosen?

You have been chosen because you are a GP currently practicing in Ireland.

Do I have to take part?

It is up to you to decide whether or not to take part. If you decide to take part you will be given this information sheet to keep. If you decide to take part you are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect you in any way.

What will happen to me if I take part?

You will complete a short questionnaire which will take approximately 5 – 7 minutes to complete. The questionnaire consists of five sections including 1) knowledge about current physical activity recommendations, 2) attitudes towards promoting physical activity, 3) conditions indicated to give advice regarding physical activity, 4) barriers against promoting physical activity and 5) information regarding your own physical activity habits.

What are the possible disadvantages and risks of taking part?

There are no disadvantages or risks foreseen in taking part in the study.

What are the possible benefits of taking part?

By taking part you will be contributing to valuable information that has not yet been investigated in this area of study in Ireland. The results of the study will be given to all participants in a strictly confidential manner which I am sure will be of great interest to all GPs'. The results of the study will help health organisations and the wider society understand how GPs operate in relation to phyiscal activity in Ireland. If barriers are identified effectively, a plan on how to tackle these barriers can then be made. A successful intervention to support GPs in promoting physical activity may result, thus, this may help increase the populations physical activity habits.

What if something goes wrong?

If you wish to complain or have any concerns about any aspect of the way you have been approached or treated during the course of this study, please contact Professor Sarah Andrew, Dean of the Faculty of Life Sciences, University of Chester, Parkgate Road, Chester, CH1 4BJ, 0044 1244 513055.

Will my taking part in the study be kept confidential?

All information which is collected about you during the course of the research will be kept strictly confidential so that only the researcher carrying out the research will have access to such information.

What will happen to the results of the research study?

The results will be written up into a report for the final project of my MSc. Individuals who participate will not be identified in any subsequent report or publication.

Who is organising the research?

The research is conducted as part of a MSc in Exercise and Nutrition Science within the Department of Clinical Sciences and Nutrition at the University of Chester. The study is organised with supervision from the department, by Gary Mortimer, an MSc student.

Who may I contact for further information?

If you would like more information about the research before you decide whether or not you would be willing to take part, please contact:

Gary Mortimer. 1322383@chester.ac.uk.

Thank you for your interest in this research.

Appendix 5 – Statistical analysis

Table A1: *Chi- Squared Test of association to test for a correlation between GPs gender and frequency of promoting PA*

Gender * Level of PA promotion Crosstabulation

			Level of PA promotion				
			Rarely, <10% of patients	Sometimes, 10-30% of patients	Often, 31-50% of patients	More often , >70% of patients	Total
Gender	Male	Count	0	20	16	5	41
		Expected Count	1.1	11.9	17.8	10.3	41.0
	Female	Count	2	2	17	14	35
		Expected Count	.9	10.1	15.2	8.8	35.0
Total		Count	2	22	33	19	76
		Expected Count	2.0	22.0	33.0	19.0	76.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.676[a]	3	.000
Likelihood Ratio	23.862	3	.000
Linear-by-Linear Association	10.348	1	.001
N of Valid Cases	76		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .92.

Referring to the above table, as 2 cells (25.0%) have expected count less than 5, this has violated the assumption and now must refer to the row labelled 'Likelihood Ratio'. Referring to the Asymp. Sig. (2- sided) column, p = .000 and is below p = .05. Therefore, there is a strong likelihood of an association between gender and frequency of promoting PA.

Table A2: *Chi- Squared Test of association to test for a correlation between GPs knowledge of PA recommendations and frequency of promoting PA*

Level of PA promotion * Knowledge of PA recommendations for Irish adults Crosstabulation

			Knowledge of PA recommendations for Irish adults		
			Yes	No	Total
Level of PA promotion	Rarely, <10% of patients	Count	1	1	2
		Expected Count	.9	1.1	2.0
	Sometimes, 10-30% of patients	Count	6	17	23
		Expected Count	10.1	12.9	23.0
	Often, 31-50% of patients	Count	15	17	32
		Expected Count	14.1	17.9	32.0
	More often , >70% of patients	Count	11	7	18
		Expected Count	7.9	10.1	18.0
Total		Count	33	42	75
		Expected Count	33.0	42.0	75.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.271[a]	3	.153
Likelihood Ratio	5.421	3	.143
Linear-by-Linear Association	4.048	1	.044
N of Valid Cases	75		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .88.

Referring to the above table, as 2 cells (25.0%) have expected count less than 5, this has violated the assumption and we must now refer to the row labelled 'Likelihood Ratio'. Referring to the Asymp. Sig. (2- sided) column, p = .143 and is above p = .05, therefore there is no significant difference between GPs knowledge of the PA recommendations and frequency of promoting PA.

Table A3: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs overall knowledge score frequency of promoting PA*

Correlations

			GPs overall knowledge score	Frequency of PA promotion
Spearman's rho	GPs overall knowledge score	Correlation Coefficient	1.000	.009
		Sig. (2-tailed)	.	.939
		N	79	78
	Frequency of PA promotion	Correlation Coefficient	.009	1.000
		Sig. (2-tailed)	.939	.
		N	78	79

Referring to the above table and consulting the row labelled Sig. (2-tailed), p = .939 and is above .05. Therefore, there is no significant correlation between GPs overall knowledge score and frequency of promoting PA.

Table A4: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs responses to the statement 'Taking the stairs at work and generally being more active each day is enough physical activity to improve health' and frequency of promoting PA.*

Correlations

			Frequency of PA promotion	Taking the stairs and generally being active improves health
Spearman's rho	Frequency of PA promotion	Correlation Coefficient	1.000	.003
		Sig. (2-tailed)	.	.981
		N	79	79
	Taking the stairs and generally being active improves health	Correlation Coefficient	.003	1.000
		Sig. (2-tailed)	.981	.
		N	79	79

Referring to the above table and consulting the row labelled Sig. (2-tailed), *p* = .981 and is above .05. Therefore, there is no significant correlation between GPs responses to the statement 'Taking the stairs at work and generally being more active each day is enough physical activity to improve health' and frequency of promoting PA.

Table A5: *Spearman's Rank Correlation Coefficient to test for correlation between GPs' responses to the statement 'Half an hour of walking on most days is all the exercise that is needed for good health' and frequency of promoting PA*

Correlations

			Frequency of PA promotion	Half an hour walking most days is all the exercise needed for good health.
Spearman's rho	Frequency of PA promotion	Correlation Coefficient	1.000	.109
		Sig. (2-tailed)	.	.343
		N	79	78
	Half an hour walking most days is all the exercise needed for good health.	Correlation Coefficient	.109	1.000
		Sig. (2-tailed)	.343	.
		N	78	78

Referring to the above table and consulting the row labelled Sig. (2-tailed), *p* = .343 and is above .05. Therefore, there is no significant correlation between GPs responses to the statement "Half an hour of walking on most days is all the exercise that is needed for good health" and frequency of promoting PA.

Table A6: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs' responses to the statement 'Exercise that is good for health must make you puff and pant' and frequency of promoting PA*

Correlations

			Frequency of PA promotion	Exercise that is good for health must make you puff and pant.
Spearman's rho	Frequency of PA promotion	Correlation Coefficient	1.000	-.202
		Sig. (2-tailed)	.	.074
		N	79	79
	Exercise that is good for health must make you puff and pant.	Correlation Coefficient	-.202	1.000
		Sig. (2-tailed)	.074	.
		N	79	79

Referring to the above table and consulting the row labelled Sig. (2-tailed), p = .074 and is above .05. Therefore, there is no significant correlation between GPs responses to the statement 'Exercise that is good for health must make you puff and pant' and frequency of promoting PA.

Table A7: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs' responses to the statement 'Several short walks of 10 minutes each on most days is better than one round of golf per week for good health' and frequency of promoting PA*

Correlations

			Frequency of PA promotion	Several short walks of 10 mins each most days is better than one round of golf per week for good health.
Spearman's rho	Frequency of PA promotion	Correlation Coefficient	1.000	-.065
		Sig. (2-tailed)	.	.566
		N	79	79
	Several short walks of 10 mins each most days is better than one round of golf per week for good health.	Correlation Coefficient	-.065	1.000
		Sig. (2-tailed)	.566	.
		N	79	79

Referring to the above table and consulting the row labelled Sig. (2-tailed), p = .566 and is above .05. Therefore, there is no significant correlation between GPs responses to the statement 'Several short walks of 10 minutes each on most days is better than one round of golf per week for good health' and frequency of promoting PA.

Table A8: *Chi-Square Test of association to test for a correlation between having completed a course or special training related to exercise science or exercise counselling and frequency of promoting PA*

Frequency of PA promotion * Completed a course or special training related to exercise science or exercise counselling Crosstabulation

			Completed a course or special training related to exercise science or exercise counselling		
			Yes	No	Total
Frequency of PA promotion	Rarely, <10% of patients	Count	0	2	2
		Expected Count	.1	1.9	2.0
	Sometimes, 10-30% of patients	Count	1	21	22
		Expected Count	.9	21.1	22.0
	Often, 31-50% of patients	Count	1	32	33
		Expected Count	1.3	31.7	33.0
	More often , >70% of patients	Count	1	18	19
		Expected Count	.8	18.3	19.0
Total		Count	3	73	76
		Expected Count	3.0	73.0	76.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.263[a]	3	.967
Likelihood Ratio	.339	3	.953
Linear-by-Linear Association	.041	1	.839
N of Valid Cases	76		

a. 5 cells (62.5%) have expected count less than 5. The minimum expected count is .08.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.059	.967
	Cramer's V	.059	.967
N of Valid Cases		76	

Table A9: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs overall confidence score and frequency of promoting PA*

Correlations

			Frequency of PA promotion	GPs overall confidence score
Spearman's rho	Frequency of PA promotion	Correlation Coefficient	1.000	.089
		Sig. (2-tailed)	.	.434
		N	79	79
	GPs overall confidence score	Correlation Coefficient	.089	1.000
		Sig. (2-tailed)	.434	.
		N	79	80

Referring to the above table and consulting the row labelled Sig. (2-tailed), p = .434 and is above .05. Therefore, there is no significant correlation between GPs overall confidence score and the frequency of promoting PA.

Table A10: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs confidence in giving general advice about PA and frequency of promoting PA*

Correlations

			Frequency of PA promotion	Confident in giving general PA advice
Spearman's rho	Frequency of PA promotion	Correlation Coefficient	1.000	-.306**
		Sig. (2-tailed)	.	.006
		N	79	79
	Confident in giving general PA advice	Correlation Coefficient	-.306**	1.000
		Sig. (2-tailed)	.006	.
		N	79	79

**. Correlation is significant at the 0.01 level (2-tailed).

Referring to the above table and consulting the row labelled Sig. (2-tailed) and the column ‘Confident in giving general PA advice, *p* = .006 and is below 0.05. Furthermore, consulting the row labelled ‘Correlation Coefficient’, r = -.306. Therefore, there is a significant, low negative correlation between GPs confidence in giving general PA advise to their patients about a physically active lifestyle and the frequency of promoting PA.

Table A11: *Spearman’s Rank Correlation Coefficient to test for a correlation between GPs confidence in suggesting specific PA programmes and frequency of promoting PA*

Correlations

			Frequency of PA promotion	Confidence in suggesting specific PA programmes
Spearman's rho	Frequency of PA promotion	Correlation Coefficient	1.000	-.282*
		Sig. (2-tailed)	.	.012
		N	79	78
	Confidence in suggesting specific PA programmes	Correlation Coefficient	-.282*	1.000
		Sig. (2-tailed)	.012	.
		N	78	78

*. Correlation is significant at the 0.05 level (2-tailed).

Referring to the above table and consulting the row labelled Sig. (2-tailed) and the column ‘Confident in giving general PA advice, *p* = .012 and is below 0.05. Furthermore, consulting the row labelled ‘Correlation Coefficient’, r = -.282. Therefore, there is a significant, low negative correlation between GPs confidence in suggesting specific PA programmes for their patients and the frequency of promoting PA.

Table A12: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs ratings of their own PA levels compared to other Irish people of the same sex and age and frequency of promoting PA*

Correlations

			Frequency of PA promotion	GPs own PA levels compared with other Irish people
Spearman's rho	Frequency of PA promotion	Correlation Coefficient	1.000	-.008
		Sig. (2-tailed)	.	.942
		N	79	79
	GPs own PA levels compared with other Irish people	Correlation Coefficient	-.008	1.000
		Sig. (2-tailed)	.942	.
		N	79	80

Referring to the above table and consulting the row labelled Sig. (2-tailed), p = .942 and is above .05. Therefore, there is not a significant correlation between GPs own PA levels compared to other Irish people of the same sex and age and frequency of promoting PA.

Table A13: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs ratings of their own PA levels compared to other Irish people of the same sex and age and their overall confidence score*

Correlations

			Overall confidence score	GPs own PA levels compared with other Irish people
Spearman's rho	Overall confidence score	Correlation Coefficient	1.000	-.318**
		Sig. (2-tailed)	.	.004
		N	80	80
	GPs own PA levels compared with other Irish people	Correlation Coefficient	-.318**	1.000
		Sig. (2-tailed)	.004	.
		N	80	80

**. Correlation is significant at the 0.01 level (2-tailed).

Referring to the above table and consulting the row labelled Sig. (2-tailed), $p = .004$ and is below .05. Therefore, there is a significant correlation between GPs own PA levels compared to other Irish people of the same sex and age and their overall confidence score. Furthermore, consulting the row labelled 'Correlation Coefficient', r = -.318. Therefore, there is a significant low negative correlation between GPs own PA levels compared to other Irish people of the same sex and age and their overall confidence score.

Table A14: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs ratings of their own PA levels compared to other Irish people of the same sex and age and their confidence in giving general PA advice*

Correlations

			Confidence in giving general PA advice	GPs own PA levels compared with other Irish people
Spearman's rho	Confidence in giving general PA advice	Correlation Coefficient	1.000	.445**
		Sig. (2-tailed)	.	.000
		N	79	79
	GPs own PA levels compared with other Irish people	Correlation Coefficient	.445**	1.000
		Sig. (2-tailed)	.000	.
		N	79	80

**. Correlation is significant at the 0.01 level (2-tailed).

Referring to the above table and consulting the row labelled Sig. (2-tailed), p = .000 and is below .05. Therefore, there is a significant correlation between GPs own PA levels compared to other Irish people of the same sex and age and their confidence in giving general PA advice. Furthermore, consulting the row labelled 'Correlation Coefficient', r = .445. Therefore, there is a significant, moderate correlation between GPs own PA levels compared to other Irish people of the same sex and age and their confidence in giving general PA advice.

Table A15: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs ratings of their own PA levels compared to other Irish people of the same sex and age and their confidence in suggesting specific PA programmes*

Correlations

			GPs own PA levels compared with other Irish people	Confidence in suggesting specific PA programmes
Spearman's rho	GPs own PA levels compared with other Irish people	Correlation Coefficient	1.000	.466**
		Sig. (2-tailed)	.	.000
		N	80	78
	Confidence in suggesting specific PA programmes	Correlation Coefficient	.466**	1.000
		Sig. (2-tailed)	.000	.
		N	78	78

**. Correlation is significant at the 0.01 level (2-tailed).

Referring to the above table and consulting the row labelled Sig. (2-tailed), p = .000 and is below .05. Therefore, there is a significant correlation between GPs own PA levels compared to other Irish people of the same sex and age and their confidence in suggesting specific PA programmes. Furthermore, consulting the row labelled 'Correlation Coefficient', r = .466. Therefore, there is a significant, moderate correlation between GPs own PA levels compared to other Irish people of the same sex and age and their confidence in suggesting specific PA programmes